

TECHNICAL SPECIFICATIONS FOR :

PROJECT: **RENOVATIONS TO
ASCENSION CATHOLIC
ELEMENTARY SCHOOL**

CLIENT: HALTON CATHOLIC DISTRICT SCHOOL BOARD

PROJECT No.: 24137

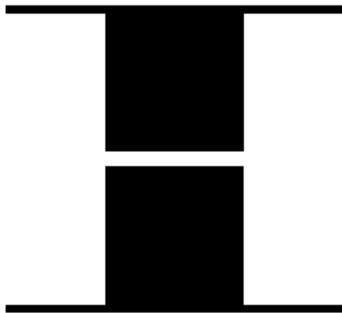
TENDER No.:

DATE: MARCH 2025

BINDER: **ARCHITECTURAL,
MECHANICAL, ELECTRICAL &
DESIGNATED SUBSTANCE REPORT**

CONSULTANTS:

HOSSACK
ARCHITECTURE



105 - 1939 IRONOAK WAY
OAKVILLE ON L6H 3V8
(905) 815-8284 admin@hossackarch.com



REGAL CONSULTING ENGINEERS INC.
2359 Royal Windsor Dr Suite 201, Mississauga, ON L5J 4S9


TRI-TECH PINNACLE
ROOF & BUILDING ENVELOPE CONSULTANTS

PROJECT NAME

Renovations to Ascension Catholic Elementary School
5205 New Street
Burlington, ON L7L 1V4

PROJECT OWNER

HALTON CATHOLIC DISTRICT SCHOOL BOARD
802 Drury Lane
Burlington, ON L7R 2Y2
Tel: (905) 632-6300

CONSULTANTS

ARCHITECT
HOSSACK ARCHITECTURE
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Tel.: (905) 815-8284

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Part 1 Invitation

1.1 BID CALL

- .1 Offers to perform Contract C00, signed under seal, executed, and dated will be received by the Architect by email at admin@hossackarch.com on or before **2:00:00 pm** local time, on the **3rd day of April 2025**.
- .2 Offers to perform Subcontract SC01 through SC09, signed under seal, executed, and dated will be received by the Architect by email at admin@hossackarch.com on or before **2:00:00 pm** local time, on **3rd day of April 2025**.
- .3 Separate Price offers, executed, and dated will be received by the Architect by email at admin@hossackarch.com on or before **2:00:00 pm** local time, on **3rd day of April 2025**.
- .3 The Bidder shall submit their Electronic Submission in only one (1) email containing all the bid submission requirements to the email address above. Email attachments should be limited to 10MB in size (total).
- .4 Proponents are cautioned that the timing of their Proposal Submission is based on when the Bid is received by the Architect at the email address above, not when a proposal is submitted by a Bidder, as Bid transmissions can be delayed in an “Internet Traffic Jam” due to file transfer size, transmission speed, etc.
- .5 For the above reasons, the Purchaser recommends that Proponents allow sufficient time to email their Bid Submission and attachment(s) and to resolve any issues that may arise. The closing time and date shall be determined by the Purchaser’s internal server clock.
- .6 Include the Project Name clearly in the email subject field.
- .7 Amendments to the submitted offer will be permitted if received at the email address above prior to bid closing and if endorsed by the same party or parties who signed and sealed the offer.
- .8 Bids are by invitation only from lists of pre-selected bidders. Bids submitted by unsolicited bidders will not be received by the Owner and will be returned unopened.

1.2 INTENT

- .1 The intent of this bid call is to obtain offers to perform identified portions of the Work to complete the construction of the RENOVATIONS TO ASENSION CATHOLIC ELEMENTARY SCHOOL located at:
5025 New Street, Burlington, Ontario L7L 1V3
- .2 Contract C00 is identified as a Canadian Construction Documents Committee (CCDC) CCDC 3 - 2016 Cost Plus a Fee Contract based on the Contract Documents.
- .3 Subcontracts SC01 through SC09 are identified as Canadian Construction Association (CCA) CCA 1- 2008 Stipulated Sum Subcontracts. Successful Subcontractors will enter into written agreements with the successful Contractor holding Contract C00, based on the Contract Documents.

- .4 Contract C00 and Subcontract SC01 will be awarded to a single Contractor.
- .5 Substantial Performance of the Work is required before the date identified in Section 01 12 00 Multiple Contract Summary.

1.3 CONTRACT DOCUMENTS IDENTIFICATION

- .1 The Contract Documents are identified as Project No.: 24137 as prepared by Hossack Architecture located at 105-1939 Ironoak Way, Oakville Ontario.

Part 2 Contract and Bid Documents

2.1 DEFINITIONS

- .1 Contract Documents: As defined in the Contract.
- .2 Bid Documents: As defined in Document 00 71 03.
- .3 Bid, Offer, or Bidding: Defined as the act of submitting an offer under seal.
- .4 Bid Price: Defined as the monetary sum identified by the Bidder in the Bid Form.

2.2 AVAILABILITY

- .1 One set of Bid Documents may be obtained electronically by each bidder from the Consultant.
- .2 Bid Documents are made available only for the purpose of obtaining offers for this project. Their use does not confer a license or grant for other purposes.

2.3 EXAMINATION

- .1 Upon receipt of Bid Documents verify that documents are complete; notify Consultant should the documents be incomplete.
- .2 Immediately notify the Consultant upon finding discrepancies or omissions in the Bid Documents.

2.4 QUESTIONS AND ADDENDA

- .1 Direct all queries in writing by email to:
Alexander Mayhew at Hossack Architecture
Email: amayhew@hossackarch.com & admin@hossackarch.com

Please include the following in the email question subject line:

24137 Renovations to Ascension Catholic Elementary School
--

- .2 Addenda may be issued during the bidding period. All addenda become part of the Contract Documents. Include costs in Bid Price.

- .3 Verbal answers are only binding when confirmed by written addenda.
- .4 Questions must be requested by bidders in writing by email not less than 5 Working Days before date set for receipt of bids. The reply will be in the form of an addendum, a copy of which will be forwarded to known bidders no later than 2 Working Days before receipt of bids.

2.5 PRODUCT / SYSTEM OPTIONS

- .1 Where Bid Documents stipulate a particular Product, requests for substitutions will not be considered by the Consultant less than 4 days before receipt of bids.
- .2 When a request to substitute a Product is made, the Consultant may approve the substitution and will issue an Addendum to known bidders.
- .3 When requesting a substitution to specified Products, include any changes required in the Work to accommodate such substitutions. A later claim by the bidder for an addition to the Contract Price resulting from changes in the Work necessitated by use of substituted Products will not be considered.
- .4 Product or system substitutions recommended by Bidders at the time of receipt of bids may be considered by Consultant if submitted as an attachment to the Bid Form. Substitutions not approved in writing by the Consultant prior to the receipt of bids shall not be included in the base Bid Price. Refer to Section 01 25 00.
- .5 Requests for Product or system substitutions submitted with the Bid Form will be evaluated and will be either included in, or excluded from, the Contract. The Consultant will be the sole judge as to their acceptability.
- .6 Provide sufficient information to enable the Consultant to determine acceptability of such Product or system substitutions.
- .7 Provide complete information on required revisions to other work to accommodate each Product or system substitution, the dollar amount of additions to or reductions from the Bid Price, including revisions to other work.
- .8 Unless requests for substitutions are submitted prior to, or as part of the bid submission, and subsequently accepted, provide the specified Products.
- .9 Prior approval to submit requests for substitutions is not required.

Part 3 Site Assessment

3.1 PRE-BID SITE EXAMINATION

- .1 A non-mandatory pre-bid site examination at the school located at 5025 New Street, Burlington, Ontario L7L 1V3, will be held at **4:00 pm** local time on **Tuesday March 18, 2025**.
- .2 Only invited **General, Mechanical or Electrical** contractors may attend.
- .3 Meet outside at the school's front entrance.

- 4 No claims for extra payment to the successful Contractor will be allowed for the execution of additional work or difficulties encountered due to conditions at the Place of the Work which were visible or reasonably inferred from an examination of the Place of the Work and the available project information prior to receipt of the Bids.

Part 4 Qualifications

4.1 INVITED GENERAL CONTRACTORS

- .1 Allies Contracting
- .2 Anacond Contracting Inc.
- .3 Design 4 General Contracting Ltd.
- .4 Golden Gate Contracting Inc.
- .5 Kessab General Contracting Ltd.
- .6 Norfield Construction Inc.
- .7 Starfleet Construction
- .8 TRP Construction

4.2 INVITED MECHANICAL CONTRACTORS

- .1 Anvi Services Ltd.
- .2 Besseling Mechanical Inc.
- .3 CEC Mechanical Ltd.
- .4 Kirk Mechanical Ltd.
- .5 L.J. Barton Mechanical Inc.
- .6 Mattina Mechanical Ltd.
- .7 Mechfield Canada
- .8 Mekcon Mechanical Services

4.3 INVITED ELECTRICAL CONTRACTORS

- .1 Best Electric Co.
- .2 CEC Services
- .3 Greomar Electrical Ltd.
- .4 Indcon Inc.
- .5 Elite Electrical
- .6 JMR Electric
- .7 L.J. Barton Inc.
- .8 North Star Electric
- .9 PHE Contractors

4.4 SUBCONTRACTORS

- .1 The Owner reserves the right to reject a proposed Subcontractor for reasonable cause. Upon such rejection, the bidder will be required to propose an alternate subcontractor with a resulting change to the Bid Price. This change can effect the status of the low bid, and may result in a different bid becoming low.
- .2 Refer to CCDC 3, GC 3.8 - Subcontractor and Supplier; and CCA 1, SCC 3.4 - Sub-subcontractors.

Part 5 Bid Submission

5.1 BID INELIGIBILITY

- .1 Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind shall, at the discretion of the Owner, be declared non-compliant.
- .2 Bids with Bid Forms and enclosures which are missing, incomplete or improperly prepared shall, at the discretion of the Owner, be declared non-compliant.
- .3 Bids that fail to include the consent of surety (where applicable) or WSIB requirements shall, at the discretion of the Owner, be declared non-compliant.
- .4 Bids based upon prices seeming to be so unbalanced as to adversely affect the interests of the Owner shall, at the discretion of the Owner, be declared non-compliant.
- .5 Bids based upon an unreasonable period of time for completion of the Work shall, at the discretion of the Owner, be declared non-compliant.

5.2 SUBMISSIONS

- .1 Bidders shall be solely responsible for the delivery of their bids in the manner and time prescribed.
- .2 Submit one copy of the properly executed offer on the Bid Forms provided, together with the required bid form supplements and attachments, in a closed opaque envelope, clearly identified with the:
 - .1 Project name and address,
 - .2 Owner's name and address,
 - .3 Bidder's name and address, and
 - .4 Relevant Contract or Subcontract number and title.
- .3 Bidders wishing to submit prices for more than one Contract or Subcontract may do so on separate bid forms, submitted separately as described above. Do not combine information pertaining to multiple Contracts or Subcontracts on a single bid form.
- .4 Subcontract bids must include the appropriate reference to the Subcontract number and title. Refer to Section 01 12 00 for the summary of Subcontract numbers and titles.
- .5 An abstract of submitted bids will be made available to bidders following bid opening.

Part 6 Bid Enclosures and Requirements

6.1 CONSENT OF SURETY

- .1 Subcontractors who are required to acquire bonding shall submit with the Bid Form a Consent of Surety, stating that the identified surety is willing to supply the Performance Bond and Labour & Materials Payment Bond required.
- .2 Include the cost of the Consent of Surety in the Bid Price.
- .3 General Contractors are to submit 'Consent of Surety' with the Bid Form stating that the identified surety is willing to supply the 50% Performance Bond and 50% Labour & Materials Payment Bond for a construction value of one million dollars (\$1,000,000).

6.2 PERFORMANCE ASSURANCE

- .1 Specified Subcontractors will be required to acquire and submit a Performance Bond and a Labour & Materials Payment Bond as described in the Supplementary Subcontract Conditions.
- .2 Include the cost of bonds in the Bid Price.

6.3 WORKPLACE SAFETY AND INSURANCE BOARD

- .1 Provide a signed confirmation from the Workplace Safety and Insurance Board (W SIB) that, at the date of the letter, the bidder maintains an account with the WSIB, and is in good standing.

6.4 TAXES

- .1 Unless specifically excluded by the Contract, include all applicable government taxes in the base Bid Price.
- .2 The General Conditions of the Contract specifically excludes Value Added Taxes, such as the Harmonized Sales Tax, from the Contract Price.
- .3 Refer to Supplementary Conditions for inclusion of taxes and procedures for tax rebate claims by the Owner.

6.5 BID FORM REQUIREMENTS

- .1 The bidder, in submitting an offer, agrees to complete the Work by the date indicated in the Contract Documents.
- .2 The Owner requires that the Work be completed as quickly and expeditiously as possible.

6.6 BID SIGNING

- .1 Sign and seal the Bid Form prior to submission using the most appropriate of the following methods:
 - .1 Sole Proprietorship: Signature of sole proprietor in the presence of a witness who will also sign. Insert the words "Sole Proprietor" under the signature.
 - .2 Partnership: Signature of all partners in the presence of a witness who will also sign.
 - .3 Limited Company: Signature of a duly authorized signing officer(s) in their normal signatures. Insert the officer's capacity in which the signing officer acts, under each signature. Affix the corporate seal. If the bid is signed by officials other than the President and Secretary of the company, or the President-Secretary-Treasurer of the company, a copy of the by-law resolution of the Board of Directors authorizing them to do so, must also be submitted with the Bid in the Bid envelope.

- .4 Joint Venture: Each party of the joint venture shall execute the Bid under their respective seals in a manner appropriate to such party as described above, similar to the requirements of a Partnership.

6.7 SUPPLEMENTS TO THE BID FORM

- .1 The following Bid Form Supplements must be submitted with the Bid:
 - .1 Bid Form Supplement A - List of Bid Documents: A complete listing of all documents and information issued, from which the Bid Price was derived.

6.8 SUPPLEMENTS TO THE SUBCONTRACT BID FORM

- .1 The following Bid Form Supplements must be submitted with the Bid:
 - .1 Bid Form Supplement A - List of Bid Documents: A complete listing of all documents and information issued, from which the Bid Price was derived.

Part 7 Offer Acceptance or Rejection

7.1 DURATION OF OFFER

- .1 Bids shall remain open to acceptance and shall be irrevocable for a period of 60 days after the bid closing.

7.2 ACCEPTANCE OF OFFER

- .1 The Owner reserves the right to accept or reject any or all offers.
- .2 The Owner will award Contract C00 and Subcontract SC01 to the same bidder. In this instance, the lowest bidder will be determined by the aggregate sum of the Contractor's Fee identified for Contract C00 and the Subcontract Price for Subcontract SC01.
- .3 The Owner reserves the right to negotiate with the lowest acceptable bidder to verify their Bid, undertake value engineering and consider the benefit of dividing the Work into multiple Subcontracts for the different Phases. The Owner may, at their sole discretion, reject a bid during such negotiations if sufficient information and cost breakdowns are not forthcoming within a reasonable time frame.
- .4 After acceptance by the Owner, the Consultant, on behalf of the Owner, will issue to the successful bidder a written bid acceptance.
- .5 After a bid has been accepted, all rejected bids will be returned to the respective bidders with submitted bid securities and other requested enclosures.

END OF SECTION

Part 1 General

1.1 THIRD-PARTY DOCUMENTS

- .1 In addition to the Drawings and the Specifications, the Owner may also distribute a collection of reports, surveys and similar types of documents relevant to the Place of the Work that have been prepared by third-parties and are intended strictly as additional information for consideration by the bidders.
- .2 Such reports have been prepared primarily for use by the Consultant. Recommendations contained therein are not considered a requirement of this Contract unless also stated as such, either specifically or by reference, in the Contract Documents.
- .3 Bidders are cautioned that such documents, by their nature, cannot reveal all conditions that exist or can occur at the Place of the Work.
- .4 Should conditions at the Place of the Work, in the opinion of the Consultant, be found to substantially vary from those identified in the third-party documents, then changes in the Work may need to be made, with appropriate adjustments being made to the Contract Price and Contract Time.
- .5 Direct questions pertaining to third-party documents by contacting the authoring organization.

1.3 DESIGNATED SUBSTANCE SURVEYS AND AUDITS

- .1 A copy of the following reports with respect to the Place of the Work has been made available as part of the Bid Documents:

Titled: **Asbestos Containing Materials - Site Report**
Ascension Catholic Elementary School
5205 New Street
Burlington, Ontario
dated October 13, 2023

Conducted by:
 Maple Environmental Inc.
Walker Davidson, Project Technologist
482 South Service Rd. E, Suite 116
Oakville, Ontario L6J 2X6
Tel 905.257-4408

1.4 DOCUMENTS DESCRIBING THE EXISTING FACILITY

- .1 Documents describing the existing facility are available for viewing by bidders at the Owner's office.
- .2 These documents were prepared by others and neither the Owner nor the Consultant can take responsibility for the accuracy of the information nor verify that they represent the actual conditions at the Place of the Work.

END OF SECTION

COST-PLUS FEE BID

Project No.: 24137

Project: Construction of the
**RENOVATIONS TO
ASCENSION CATHOLIC ELEMENTARY SCHOOL**

Located At: 5205 New Street, Burlington, ON L7L 1V4

For: The Halton Catholic District School Board
802 Drury Lane, Burlington, Ontario L7R 2Y2

Bidder
Legal Name: _____
(Company Name)

Address: _____
(Business Address)

(City, Province, Postal Code)

Bid Price

Having examined the Bid Documents as listed in Bid Form Supplement A, and Addenda No. _____ to _____ inclusive, all as issued by Hossack & Associates Architects and having visited the Place of the Work; we hereby offer to enter into a Contract to perform the Work required by the Bid Documents for the Cost of the Work, plus:

A fixed fee of: _____ Dollars

and _____ cents (\$ _____)

in Canadian funds, which price excludes Value Added Taxes (such as HST).

Appendices to Bid: This fee is to include the Cash Allowance amount outlined in Section 01 11 00 Summary of Work, item 1.37. When requested, information on Subcontractors, Unit Prices, Alternative Prices, Separate Prices and Itemized Prices is provided in the attached Appendices and forms an integral part of this Bid. These prices do not include Value Added Taxes.

Interest:

Should either party fail to make payments as they become due under the terms of the Contract or in an award by arbitration or court, interest payments on such unpaid amounts as stated in Article A-8 PAYMENT shall also become due and payable until payment. The prime rate shall be the rate of interest quoted by:

(Insert name of chartered lending institution whose prime rate is to be used)

for prime business loans as it may change from time to time.

Declarations:

We hereby declare that:

- (a) We agree to perform the Work in compliance with the required completion schedule stated in the Bid Documents;
- (b) No person, firm or corporation other than the undersigned has any interest in this Bid or in the proposed Contract for which this Bid is made;
- (c) This Bid is open to acceptance for a period of Sixty (60) days from the date of bid closing.

Signatures

SIGNED AND SUBMITTED for and on behalf of:

(name of bidder)

(signature)

(name and title of person signing)

(signature)

(name and title of person signing)

Witness

(signature)

(name and title of person signing)

Date: _____

N.B. Where legal jurisdiction or Owner requirement calls for:

- a) proof of authority to execute this Bid, attach such proof of such authority in the form of a certified copy of a resolution naming the representative(s) authorized to sign this Bid for and on behalf of the Corporation or Partnership; or
- b) the affixing of a corporate seal, this Bid should be properly sealed.

Project: Construction of the
**RENOVATIONS TO
ASCENSION CATHOLIC ELEMENTARY SCHOOL**

Located At: 5205 New Street, Burlington, ON L7L 1V4

Bidder:

(Company Name)

LIST OF BID DOCUMENTS

The following is the list or description of the Bid Documents referred to in the Bid for the above named Project:

DRAWINGS: As listed on the Cover Sheet of the Drawings

SPECIFICATIONS: As listed in 00 01 10 - TABLE OF CONTENTS

ADDITIONAL INFORMATION: As described in Section 00 31 00 - AVAILABLE PROJECT INFORMATION.

STIPULATED PRICE SUBCONTRACT BID

Project No.: 24137

Subcontract No. SC - _____

Project: Construction of the
**RENOVATIONS TO
ASCENSION CATHOLIC ELEMENTARY SCHOOL**

Located At: 5205 New Street, Burlington, ON L7L 1V4

For: The Halton Catholic District School Board
802 Drury Lane, Burlington, Ontario L7R 2Y2

Subcontract Bidder

Legal Name: _____
(Company Name)

Address: _____
(Business Address)

(City, Province, Postal Code)

Subcontract Bid Price

Having examined the Bid Documents as listed in Bid Form Supplement A, and Addenda No. _____ to _____ inclusive, all as issued by Hossack & Associates Architects Inc. and having visited the Place of the Work; we hereby offer to enter into a Subcontract to perform the Work of Subcontract SC- _____ required by the Bid Documents for the stipulated price of:

_____ Dollars

and _____ cents (\$ _____)

in Canadian funds, which price excludes Value Added Taxes (such as HST).

Interest:

Should either party fail to make payments as they become due under the terms of the Contract or in an award by arbitration or court, interest payments on such unpaid amounts as stated in Article A-8 PAYMENT shall also become due and payable until payment. The prime rate shall be the rate of interest quoted by:

(Insert name of chartered lending institution whose prime rate is to be used)
for prime business loans as it may change from time to time.

Declarations:

We hereby declare that:

- (a) We agree to perform the Subcontract Work in compliance with the required completion schedule stated in the Bid Documents, or if no schedule is stated, to attain Substantial Performance of the Subcontract Work within _____ weeks from commencement of the Work;
- (b) No person, firm or corporation other than the undersigned has any interest in this Bid or in the proposed Contract for which this Bid is made;
- (c) We agree to enter into a Subcontract Agreement, as identified in the Contract Documents, with the successful Contractor;
- (d) This Bid is open to acceptance for a period of Sixty (60) days from the date of bid closing.

Signatures

SIGNED AND SUBMITTED for and on behalf of:

(name of bidder)

(signature)

(name and title of person signing)

(signature)

(name and title of person signing)

Witness

(signature)

(name and title of person signing)

Date: _____

- N.B. Where legal jurisdiction or Owner requirement calls for:
- a) proof of authority to execute this Bid, attach such proof of such authority in the form of a certified copy of a resolution naming the representative(s) authorized to sign this Bid for and on behalf of the Corporation or Partnership; or
 - b) the affixing of a corporate seal, this Bid should be properly sealed.

BID FORM SUPPLEMENT A to Stipulated Price Subcontract Bid

Project No.: 24137

Project: Construction of the
**RENOVATIONS TO
ASCENSION CATHOLIC ELEMENTARY SCHOOL**

Located At: 5205 New Street, Burlington, ON L7L 1V4

Subcontract
Bidder:

(Company Name)

LIST OF BID DOCUMENTS

The following is the list or description of the Bid Documents referred to in the Bid for the above named Project:

DRAWINGS: As listed on the Cover Sheet of the Drawings

SPECIFICATIONS: As listed in 00 01 10 - TABLE OF CONTENTS

ADDITIONAL INFORMATION: As described in Section 00 31 00 - AVAILABLE PROJECT INFORMATION.

SEPARATE PRICES

To Subcontract No. SC – 01 GENERAL

Project No.: 24137

Project: Construction of the
**RENOVATIONS TO
ASCENSION CATHOLIC ELEMENTARY SCHOOL**

Located At: 5205 New Street, Burlington, ON L7L 1V4

For: The Halton Catholic District School Board
802 Drury Lane, Burlington, Ontario L7R 2Y2

Subcontract Bidder

Legal Name: _____
(Company Name)

1.0 **Separate Prices** are for Work that is not included in the Cost-Plus Fee Bid or a Stipulated Price Subcontract Bid but which may be added by the School Board for the price quoted below.

Separate Price No. 1: **DOOR REPLACEMENTS:** “The total amount to be added to the **Stipulated Price** **SUBCONTRACT No. 24137-SC01 – GENERAL** to provide replacement hollow metal or wood doors as described on drawings, Door Schedule (located on drawing ‘A11 Interior Elevations & Schedules’) and specification sections 08 11 14 - Steel Doors and Frames, 08 14 10 - Flush Wood Doors and 08 80 50 – Glazing – for doors only (Glazing for windows and curtainwall to be included in window subcontract pricing).”:

Separate Price No. 1 ADD: \$ _____

Signatures

SIGNED AND SUBMITTED for and on behalf of:

(name of bidder)

(signature)

(name and title of person signing)

Date: _____

Part 1 General

1.1 AGREEMENT

- .1 The CCDC 3-2016 Cost Plus Contract, as amended below, forms the basis of Agreement between the Owner and the Contractor.

1.2 AMENDMENTS TO THE AGREEMENT

- .1 Article A-4 - Cost of the Work

- .1 Delete Paragraph A-4.1 in its entirety and replace with the following: "The Cost of the Work, which excludes Value Added Taxes, shall be comprised of the stipulated sum costs of subsequently awarded Subcontracts, as nominated by the Owner, and the following:

- .1 deposits lost;
- .2 the costs to the Contractor that result from any Subcontractor's or Supplier's insolvency or failure to perform;
- .3 royalties, patent license fees and damages for infringement of patents and cost of defending suits therefor subject always to the Contractor's obligations to indemnify the Owner as provided in paragraph 10.3.1 of GC 10.3 - PATENT FEES;
- .4 losses and expenses sustained by the Contractor for matters which are the subject of insurance under the policies prescribed in GC 11.1 - INSURANCE when such losses and expenses are not recoverable because the amounts are in excess of collectible amounts or within the deductible amounts;
- .5 legal costs, incurred by the Contractor, in relation to the performance of the Work provided that they are not caused by negligent acts or omissions of the Contractor and the Work is performed in accordance with the Contract Documents; and
- .6 the cost of auditing when requested by the Owner.

Notwithstanding the foregoing and any provisions contained in the General Conditions of the Contract, it is the intention of the parties that the Cost of the Work referred to herein shall cover and include any and all contingencies other than those which are the result of or occasioned by any failure on the part of the Contractor to exercise reasonable care and diligence in the Contractor's attention to the Work. Any cost due to failure on the part of the Contractor to exercise reasonable care and diligence in the Contractor's attention to the Work shall be borne by the Contractor."

- .2 Article A-5 - Contractor's Fee
 - .1 Delete Paragraph A-5.1.1 in its entirety.

- .3 Article A-7 - Options
 - .1 Delete Paragraph A-7.2 in its entirety.
 - .2 Delete Paragraph A-7.3 in its entirety.

- .4 Article A-8 - Payment
 - .1 Revise Subparagraph A-8.1.1 to insert the phrase "... make progress payments to Contractor subject to GC 5.4 - Progress Payment...".

END OF SECTION

Part 1 General

1.1 AGREEMENT

Part 1 General

1.1 AGREEMENT

- .1 The CCA 1-2008 Stipulated Price Subcontract, as amended below, forms the basis of Agreement between the Contractor and the Subcontractor.

1.2 AMENDMENTS TO THE AGREEMENT

- .1 Delete Article 1B in its entirety.
- .2 Delete Article 2B in its entirety.
- .3 Delete Article 3B in its entirety.
- .4 Article 5 - SUBCONTRACT PRICE, delete Paragraph 5.5 in its entirety.
- .5 Article 6 - PAYMENT, Paragraph 6.2, Third Sentence; revise to read as follows: "The Contractor shall pay the Subcontractor, in accordance with the payment procedures required by the Contract Documents, no later than thirty (30) days after the date of the Consultant's certificate of payment, 90 percent of the amount applied for or such other amount as the Consultant determines to be properly due."
- .6 Article 6 - PAYMENT, Paragraph 6.4; revise to read as follows: "... and for which the Contractor or Owner might in any way be held responsible ..."
- .7 Article 6 - PAYMENT, Paragraph 6.4; delete Subparagraph 6.4.2 in its entirety.

END OF SECTION

- .1 The CCA 1-2008 Stipulated Price Subcontract, as amended below, forms the basis of Agreement between the Contractor and the Subcontractor.

1.2 AMENDMENTS TO THE AGREEMENT

- .1 Delete Article 1B in its entirety.
- .2 Delete Article 2B in its entirety.
- .3 Delete Article 3B in its entirety.
- .4 Article 5 - SUBCONTRACT PRICE, delete Paragraph 5.5 in its entirety.
- .5 Article 6 - PAYMENT, Paragraph 6.2, Third Sentence; revise to read as follows: "The Contractor shall pay the Subcontractor, in accordance with the payment procedures required

Consultant's by the Contract Documents, no later than thirty (30) days after the date of the certificate of payment, 90 percent of the amount applied for or such other amount as the Consultant determines to be properly due."

.6 Article 6 - PAYMENT, Paragraph 6.4; revise to read as follows: "... and for which the Contractor or Owner might in any way be held responsible ..."

.7 Article 6 - PAYMENT, Paragraph 6.4; delete Subparagraph 6.4.2 in its entirety.

END OF SECTION

Part 1 General

1.1 AGREEMENT

- .1 The CCDC 3-2016 Cost Plus Contract, includes the Definitions of specific words and terms.

1.2 SUPPLEMENTARY DEFINITIONS

- .1 Amend the Definition of the term Contract Documents by inserting the words "in writing" after the words "agreed upon".
- .2 Amend the Definition of the term Contractor's Fee by adding the following: "... and including amounts for all overhead and profit, bond and insurance premiums, and any costs for labour and Products required by the Contractor to undertake portions of the Work identified in the Contract Documents and not included in an Owner-nominated Subcontract."
- .3 Delete the Definition of the term Guaranteed Maximum Price ("GMP") in its entirety.
- .4 Delete the Definition of the term Target Contract Price in its entirety.
- .5 Add a new Definition for Bid Documents, as follows: "The Bid Documents shall consist of the Contract Documents, Instructions to Bidders, Bid Form, and other available project information issued for the benefit of bidders."

END OF SECTION

Part 1 General

1.1 AGREEMENT

- .1 The CCA 1-2008 Stipulated Price Subcontract includes the Definitions of specific words and terms.

1.2 SUPPLEMENTARY SUBCONTRACT DEFINITIONS

- .1 Add a new Definition for Bid Documents, as follows: "The Bid Documents shall consist of the Contract Documents, Instructions to Bidders, Bid Form, and other available project information issued for the benefit of bidders."

END OF SECTION

Part 1 General

1.1 GENERAL CONDITIONS

- .1 CCDC 3-2016, The General Conditions of the Cost Plus Contract is the General Conditions between the Owner and Contractor.

1.2 SUPPLEMENTARY CONDITIONS

- .1 Refer to Supplementary Conditions for amendments and supplements to the General Conditions.

END OF SECTION

Part 1 General

1.1 SUBCONTRACT CONDITIONS

- .1 CCA 1-2008, The Subcontract Conditions of the Stipulated Price Subcontract are the Subcontract Conditions between the Contractor and the Subcontractors.

1.2 SUPPLEMENTARY SUBCONTRACT CONDITIONS

- .1 Refer to Supplementary Subcontract Conditions for amendments and supplements to the Subcontract Conditions.

END OF SECTION

Part 1 Supplements to General Conditions

1.1 GC 1.1 - CONTRACT DOCUMENTS

- .1 Delete Paragraph 1.1.8 and replace with the following: "The Contractor will be given two hard-copy sets and one electronic-copy set of the Contract Documents without charge. The Contractor may produce as many additional hard-copy sets of the Contract Documents from the electronic-copy as they deem necessary to undertake the Work, at their own expense."
- .2 Add new Paragraph 1.1.11 as follows: "The location of fixtures, outlets, conduit, piping and any other locations shown or specified but not dimensioned shall be considered approximate. The actual location shall be as approved by the Consultant and as required to suit job conditions."

1.2 GC 2.2 - ROLE OF THE CONSULTANT

- .1 Add new Subparagraph 2.2.7.1 as follows: "Verbal instructions, regardless of the source, will not be binding on the parties to the Contract, unless otherwise confirmed in writing by the Owner or the Consultant ."

1.3 GC 2.4 - DEFECTIVE WORK

- .1 Add new Paragraph 2.4.3 as follows: "Where defective work or work not performed as provided in the Contract Documents is the responsibility of a Subcontractor or Supplier, the Contractor shall require the responsible Subcontractor or Supplier to Make Good the defective work or work not performed as provided in the Contract Documents so as to conform with the Contract Documents."

1.4 GC 3.2 - CONSTRUCTION BY OWNER OR OTHER CONTRACTORS

- .1 Delete Paragraph 3.2.2 in its entirety.
- .2 Add new Subparagraph 3.2.2.5 as follows: "Notify the Contractor no later than 2 Working Days prior to any other contractor or their own forces being on site. The Contractor will make all necessary arrangements to accommodate access and maintain compliance with applicable health and construction safety legislation at the Place of the Work".
- .3 Revise Subparagraph 3.2.3.4 to read as follows: "Assume overall responsibility for the separate contractors and Owner's own forces and for compliance with applicable health and construction safety legislation at the Place of the Work".

1.5 GC 3.5 - CONSTRUCTION SCHEDULE

- .1 Add new Paragraph 3.5.2 as follows: "Where portions of the Work are performed by Subcontractors or Suppliers, the Contractor shall coordinate with, and arrange for the Subcontractors and Suppliers to provide detailed construction schedules for their portion of the Work, to be submitted along with the construction schedule described herein."

- .2 Add new Paragraph 3.5.3 as follows: "No change in Contract Time resulting from a change in the Work will be accepted, if, in the Consultant's opinion, such change in the Work can reasonably be accommodated within the approved schedule."
- .3 Amend Paragraph 3.5.1.1 by deleting the phrase "... the first application for payment ..." and replacing it with "... commencing the work ...".

1.6 GC 3.7 - SUBCONTRACTORS AND SUPPLIERS

- .1 Revise Subparagraph 3.7.1.1 to read as follows: "enter into contracts or written agreements with Subcontractors or Suppliers, including those nominated by the Owner, to require them to perform their work as provided in the Contract Documents;
 - .1 The Consultant will prepare the written agreements between the Contractor and each Subcontractor or Supplier, based upon a modified CCA 1-2008, Stipulated Price Subcontract, similar in content and intent of this Contract."
- .2 Add new Subparagraph 3.7.1.4 as follows: "immediately notify the Consultant of any acts or omissions of Subcontractors or Suppliers and of persons directly or indirectly employed by them."
- .3 Add new Subparagraph 3.7.2.1 as follows: "The Contractor shall not change or terminate Subcontractors or Suppliers without the prior written permission of the Owner."
- .4 Add new Paragraph 3.7.6 as follows: "The Owner may direct the Contractor to terminate the contract of a Subcontractor or Supplier and the Owner shall nominate a replacement Subcontractor or Supplier to complete that part or portion of the Work. The Contractor shall enter into a contract with the nominated Subcontractor or Supplier for the completion of that portion of the Work. In the event of such an instance, the Contract Time and the Contractor's Fee is to be adjusted by an appropriate amount. The Contractor may reasonably refuse to terminate the contract of a Subcontractor or Supplier if to comply with the Owner's direction would result in a breach of any of the Contractor's obligations under GC 9.4 - CONSTRUCTION SAFETY."
- .5 Add new Paragraph 3.7.7 as follows: "The Contractor shall involve the Consultant in any communications with the Subcontractors or Suppliers related to GC 3.5 – CONSTRUCTION SCHEDULE and PART 6 - CHANGES IN THE WORK. The Consultant may discuss issues directly with the Subcontractors and Suppliers related to GC 3.5 – CONSTRUCTION SCHEDULE and PART 6 - CHANGES IN THE WORK , however, the Consultant shall not direct or supervise the Work."
- .6 Add new Paragraph 3.7.8 as follows: "The Contractor shall enter into contracts or written agreements with Subcontractors for the Subcontracts identified in the Contract Documents. Such Subcontractors may be union or non-union affiliated. The Contractor shall not be party to any agreement that would prevent them from entering into such Subcontracts."

1.7 GC 3.8 - LABOUR AND PRODUCTS

- .1 Add new Paragraph 3.8.3 as follows: "The Contractor will cooperate with the Owner to avoid labour complications and will employ workers whose presence and work will be acceptable to, and be in harmony with, other workers employed on the Work, and under

conditions satisfactory to the Owner. In the event of labour difficulties resulting from the employment of workers by the Contractor or by the presence of the Contractor on the Project, the Contractor will make any necessary arrangements as required by the Owner in order to prevent delays and additional expense to the Owner."

- .2 Add new Paragraph 3.8.4 as follows: "The Contractor is responsible for the safe on-site storage of Products and their protection (including Products supplied by the Owner) in such a way to avoid dangerous conditions or contamination to the Products or other person or property."

1.8 GC 4.1 - CASH ALLOWANCES

- .1 Delete Paragraph 4.1.1 in its entirety.
- .2 Revise Paragraph 4.1.6 by deleting the phrase "... and the Guaranteed Maximum Price ...".
- .3 Add new Paragraph 4.1.8 as follows: "Unexpended Cash Allowances will be deducted from the Contract Price."

1.9 GC 5.2 - ACCOUNTING AND AUDIT

- .1 Revise Paragraph 5.2.1 by replacing the phrase "... Cost of the Work as in accordance with Article A-3 - CONTRACT DOCUMENTS." with "... payments under the Contract."
- .2 Revise Paragraph 5.2.2 by replacing the phrase "... Cost of the Work ..." with "... payments under the Contract ...".

1.10 GC 5.3 - APPLICATIONS FOR PROGRESS PAYMENT

- .1 Revise Paragraph 5.3.1 to read as follows: "The Contractor shall make monthly applications for payment on account as provided in Article A-8 of the Agreement - PAYMENT as the Work progresses."

1.11 GC 5.4 - PROGRESS PAYMENT

- .1 Revise Subparagraph 5.4.1.3 to read as follows: "The Owner shall make payment to the Contractor on account as provided in Article A-8 of the Agreement - PAYMENT no later than fourteen calendar days after the date of a certificate for payment by the Consultant."
- .2 Add a new Paragraph 5.4.2 as follows: "The Contractor shall make payments to the Subcontractors and Suppliers in the amounts certified as payable by the Consultant, no later than twenty calendar days after the date of the certificate for payment."

1.12 GC 5.5 - SUBSTANTIAL PERFORMANCE OF THE WORK

- .1 Add new Paragraph 5.5.4 as follows: "The Contractor's application for a Certificate of Substantial Performance of the Work shall, without limiting the foregoing, include the following:
 - .1 A written statement to the Owner and the Consultant stating that:

- .1 The Contract is substantially performed,
- .2 The performance of the balance of the Contract is in process, and identifying the date when this Work will be completed. Where portions of the Contract can not be completed forthwith for reasons beyond the Contractor's control, the Contractor shall indicate completion dates for each outstanding portion of the Work."
- .2 A statement showing the amount of holdback monies due for release and payment following the issue of the Certificate of Substantial Performance of the Work.
- .3 A statement of completion with the cost value of:
 - .1 the portion of the Work to be completed, including any defective work or work not performed as provided in the Contract Documents.
 - .2 portions of the Work which can not be performed for reasons beyond the control of the Contractor.
- .4 The submission of all data, operating instructions, maintenance manuals, record drawings, spare parts and materials, evidence of all tests, instructions to Owner's representatives, warranties and any other such documents to enable the Owner to operate and maintain the Project."
- .2 Add new Paragraph 5.5.5 as follows: "When making an application for Substantial Performance of the Work, the Contractor shall submit to the Consultant all specified warranties, bonds, maintenance manuals, records, certificates and a Statutory Declaration in a form acceptable to the Consultant, signed by the Contractor, stating that all material, work and services in connection with the Contract have been paid in full, up to the holdback, and that no liens exist, including a receipt from each Subcontractor and Supplier, stating that it has been paid in full up to the holdback for all services and materials supplied in connection with this Contract, and such other statements as the Owner and Consultant may require."

1.13 GC 5.8 - FINAL PAYMENT

- .1 Revise Paragraph 5.8.4 by replacing the words "... five calendar days ..." to read "... fourteen calendar days ...".
- .2 Add new Paragraph 5.8.5 as follows: "Subject to the lien legislation applicable to the Place of the Work, the Contractor shall make payments to the Subcontractors and Suppliers in the amounts certified as payable by the Consultant, no later than twenty calendar days after the date of the certificate for payment."

1.14 GC 6.2 - CHANGE ORDER

- .1 Revise Paragraph 6.2.1 by deleting the phrase "... GMP or the Target Contract Price; ..." and replacing it with "... Contract Price; ...".
- .2 Revise Paragraph 6.2.2 by deleting the phrase "... GMP, Target Contract Price, ..." and replacing it with "... Contract Price ...".

- .3 Add new Paragraph 6.2.3 as follows: "The value of a change to the Contractor's Fee shall be charged as a percentage of the actual increase to the Cost of the Work, as follows:
 - .1 On additional work performed by the Contractor's own forces: 5 percent;
 - .2 On additional work performed by Owner-Nominated Subcontractors and Suppliers: 0 percent; and
 - .3 On additional work performed by Contractor-appointed Subcontractors and Suppliers: 5 percent."

1.15 GC 6.3 - CHANGE DIRECTIVE

- .1 Revise paragraph 6.3.1 by deleting the phrase "... in the GMP, in the Target Contract Price, ..." and replacing it with "... in the Contract Price, ...".
- .2 Revise paragraph 6.3.7 by deleting the phrase "... to the GMP, to the Target Contract Price, ..." and replacing it with "... to the Contract Price, ...".
- .3 Add new Paragraph 6.3.8 as follows: "The value of a change to the Contractor's Fee shall be charged as a percentage of the actual increase to the Cost of the Work, as follows:
 - .1 On additional work performed by the Contractor's own forces: 5 percent;
 - .2 On additional work performed by Owner-Nominated Subcontractors and Suppliers: 0 percent; and
 - .3 On additional work performed by Contractor-appointed Subcontractors and Suppliers: 5 percent."

1.16 GC 7.2 - CONTRACTOR'S RIGHT TO TERMINATE CONTRACT

- .1 Add new Paragraph 7.2.6 as follows: "If the Contractor stops the Work or terminates the Contract as provided for in the preceding paragraphs, he shall ensure that the Place of the Work and the Work are left and maintained in a secure and safe condition as required by authorities having jurisdiction and these Contract Documents."

1.17 GC 9.1 - PROTECTION OF WORK AND PROPERTY

- .1 Add new Paragraph 9.1.5 as follows: "Should there be a stoppage of the Work, for any cause, the Contractor shall assume all responsibility for protecting the Work and Provide and maintain security to the Work and the Place of the Work during such periods, with appropriate adjustments being made to the Contractor's Fee and Contract Time when it can be proven that the stoppage of the Work was not caused by any action or lack of action on the part of the Contractor."

1.18 GC 9.4 - CONSTRUCTION SAFETY

- .1 Amend Paragraph 9.4.1 by deleting the phrase "Subject to paragraph 3.2.3.4 of GC 3.2 - CONSTRUCTION BY OWNER OR OTHER CONTRACTORS".

- .2 Add new Paragraph 9.4.2 as follows: "The Contractor shall comply and cause all of its subcontractors and Suppliers to comply with all applicable provisions, requirements, and safety standards of the Ontario Occupational Health and Safety Act and regulations thereto.
The Contractor shall be designated and hereby accepts the responsibilities and designation as "constructor" under the Occupational Health and Safety Act on the project and hereby assumes all liabilities and obligations imposed on a "constructor" by the Occupational Health and Safety Act".
- .3 Add new Paragraph 9.4.3 as follows: "Prior to commencement of the Work, the Contractor shall submit to the Owner:
 - .1 Documentation of a valid Workplace Safety and Insurance Board clearance certificate and confirmation of the Contractor's WSIB CAD-7 performance rating.
 - .2 Documentation of the Contractor's insurance coverage.
 - .3 Documentation of the Contractor's safety-related programs for the Project.
 - .4 A copy of the Notice of Project filed with the Ministry of Labour."
- .4 Add new Paragraph 9.4.4 as follows: "The Contractor hereby represents and warrants to the Owner that appropriate health and safety instruction and training has been provided and will be provided to the Contractor's employees before the Work is commenced and agrees to provide to the Owner and Consultant satisfactory proof of such instruction and training. The Contractor further undertakes to verify that other contractors and the Owner's own forces have received appropriate health and safety instruction and training in accordance with GC 3.2."
- .5 Add new Subparagraph 9.4.4.1 as follows: "The Contractor shall require proof from the Subcontractors and Suppliers that appropriate health and safety instruction and training has been provided to the Subcontractor's and Supplier's employees before the Work is commenced. This information will be kept on file at the site."
- .6 Add new Paragraph 9.4.5 as follows: "The Contractor shall tour the appropriate area to familiarize itself with the job site prior to the commencement of the Work",
- .7 Add new Paragraph 9.4.6 as follows: "The Contractor shall never work in a manner that may endanger anyone".
- .8 Add new Paragraph 9.4.7 as follows: "The Contractor shall indemnify and save harmless the Owner, together with the Owner's agents, officers, directors, employees, consultants, successors and assigns, from and against any and all safety infractions under the Ontario Occupational Health and Safety Act, and regulations thereto including the payment of all legal fees on a solicitor and client basis."
- .9 Add new Paragraph 9.4.8 as follows: "The Contractor shall ensure that its employees, Subcontractors and Suppliers comply with the foregoing conditions".

1.19 GC 10.1 - TAXES AND DUTIES

- .1 Add new Paragraph 10.1.2 as follows: "With respect to taxes and duties, the Contractor shall, at the request of the Owner, assist, join in, or at the Owner's expense, make application on behalf of the Owner for any exemption, recovery or refund. The Contractor shall provide the Owner with copies, or, where required original of records, invoices, purchase orders or other documentation as may be necessary to support such application."
- .2 Add new Paragraph 10.1.3 as follows: "Any amount included in the Contract or any Subcontract for tax or duty, whether or not paid, which is found to be inapplicable or for which a refund is obtained shall become the sole and exclusive property of the Owner."

1.20 GC 10.2 - LAWS, NOTICES, PERMITS & FEES

- .1 Add to Paragraph 10.2.2 as follows: "The Contractor shall take all necessary steps to obtain the occupancy permit, including delivering any notice of completion of the building required by the authorities having jurisdiction."
- .2 Add new Paragraph 10.2.8 as follows: "The Contractor's or its Subcontractor's or Supplier's compliance with statutes or regulations made thereunder or by-laws shall not relieve them of obligations set out in the Contract Documents which may be more extensive than the requirements of those statutes, regulations or by-laws."

1.21 GC 11.1 - INSURANCE

- .1 Delete Subparagraph 11.1.1.1 in its entirety and replace with the following: "General liability insurance shall be in the joint names of the Contractor, the Owner, the Consultant, and any and all Subcontractors and subconsultants involved in the Work, with limits not less than \$5,000,000 per occurrence and with a property damage deductible not exceeding \$5,000. The insurance coverage shall include at least the following extensions: Premises, Property and Operations; Occurrence basis, Owners/Contractors protective, Products and Completed Operations; Blanket Contractual; Employees as Additional Insureds; Broad Form Property Damage; Broad Form Loss of Use; Personal Injury; Incidental Malpractice; Contingent Employers Liability; Cross Liability/Severability of Interests; Non-Owned Automobile Liability including Endorsement Form 96; Intentional Injury to protect persons or property, X-plate/unlicensed/specially licensed vehicles; Attached Machinery; Hostile fire exception to any pollution exclusion; Voluntary Medical Payments. To achieve the desired limit, umbrella or excess liability insurance may be used. All liability coverage shall be maintained for the completed operations hazard from the date of Substantial Performance of the Work, for 24 months following. The Policy shall be endorsed to provide the named insured with not less than 30 days notice in writing in advance of any cancellation or change or amendment restricting coverage."
- .2 Delete Subparagraph 11.1.1.2 in its entirety.
- .3 Delete Subparagraph 11.1.1.3 in its entirety.
- .4 Delete Subparagraph 11.1.1.4 in its entirety.
- .5 Delete Subparagraph 11.1.1.5 in its entirety.

- .6 Delete Subparagraph 11.1.1.6 in its entirety.
- .7 Delete Subparagraph 11.1.1.7 in its entirety.
- .8 Add new Paragraph 11.1.7 as follows: "Notwithstanding the fact that a claim has been made under any insurance policy described in GC 11.1, the Contractor shall continue to perform its obligations under the Contract ."

1.22 GC 12.3 - WARRANTY

- .1 Add new Paragraph 12.3.7 as follows: "Should the Work be delayed due to conditions beyond the control of the Contractor, the warranty period shall commence at the time of acceptance of the Work by the Owner."
- .2 Add new Paragraph 12.3.8 as follows: "Where warranty repairs on such parts or portions of the Work become necessary, the Consultant will notify the Contractor which Subcontractor or Supplier is responsible to rectify the defective work or work not performed as provided in the Contract Documents."

END OF SECTION

Part1 Supplements to Subcontract Conditions

1.1 SCC 1.1 – DOCUMENTS

- .1 Delete Subparagraph 1.1.7.2 in its entirety.
- .2 Revise Paragraph 1.1.8 as follows: "The Consultant shall provide the Subcontractors, without charge, ..."
- .3 Add new Paragraph 1.1.9 as follows: "The location of fixtures, outlets, conduit, piping and any other locations shown or specified but not dimensioned shall be considered approximate. The actual location shall be as approved by the Consultant and as required to suit job conditions."

1.2 SCC 2.2 - REVIEW AND INSPECTION OF THE WORK

- .1 Revise Paragraph 2.2.2 as follows: "... the Subcontractor shall give the Contractor and Consultant timely notice requesting inspection."

1.3 SCC 2.3 - DEFECTIVE WORK

- .1 Revise Paragraph 2.3.1 as follows: "The Subcontractor shall within 5 Working Days remove from the Place of the Work and Make Good defective work that has been rejected by the Contractor or Consultant as failing to conform to the Contract Documents ...".

1.4 SCC 3.4 - SUB-SUBCONTRACTORS

- .1 Revise Subparagraph 3.4.1.3 as follows: "be as fully responsible to the Contractor, Owner and Consultant for acts and omissions of Sub-Subcontractors and of persons directly or indirectly employed by them as for acts and omissions of persons directly employed by the Subcontractor."
- .2 Revise Paragraph 3.4.6 as follows: "The Contractor or Consultant may provide to a Sub-Subcontractor information as to the percentage ...".

1.5 SCC 3.5 - SHOP DRAWINGS

- .1 Revise Paragraph 3.5.2 as follows: "The Consultant shall determine the number of copies of Shop Drawings ...the Subcontractor shall notify the Contractor and Consultant in writing of any deviations ...".

1.6 SCC 3.7 - CUTTING AND REMEDIAL WORK

- .1 Revise Paragraph 3.7.3 as follows: "... nor alter the work of any others without the Contractor's and Consultant's written consent, where such member, existing work or other work is apparent from the Subcontract Documents, reasonable examination or instruction of the Consultant."
- .2 Add a new Paragraph 3.7.6 as follows: "Each Subcontractor shall make allowances in his own work to accommodate other Subcontractor's work. The Contractor shall coordinate the cutting and remedial work amongst Subcontractors such that all pieces come together

properly."

1.7 SCC 4.1 - CASH ALLOWANCES

- .1 Revise Paragraph 4.1.3 to read as follows: "Expenditures under cash allowances shall be authorized by the Consultant."

1.8 SCC 5.1 - APPLICATIONS FOR PAYMENT

- .1 Revise Paragraph 5.1.2 as follows: "The Subcontractor shall submit to the Contractor for the Consultant's approval before the first application ..."
- .2 Revise Paragraph 5.1.3 as follows: "... supported by such evidence as the Consultant may reasonably direct and when accepted by the Contractor, with the approval of the Consultant, shall ..."
- .3 Add new Paragraph 5.1.6 as follows: "Each application for payment must include the Subcontractor's GST Registration number."
- .4 Add new Paragraph 5.1.7 as follows: "The Subcontractor shall submit with every application for payment, a "Certificate of Standing" from the Workplace Safety & Insurance Board (WSIB) stating that the Subcontractor has complied with the requirements of the Workers' Compensation Act and is in good standing as of the date of the Certificate."

1.9 SCC 6.1 - CONTRACTOR'S RIGHT TO MAKE CHANGES

- .1 Revise Paragraph 6.1.1 as follows: "The Contractor, with the approval of the Consultant, and without invalidating the Subcontract, may make changes ...".
- .2 Add new Paragraph 6.1.3 as follows: "The Subcontractor shall respond to requests for information pertaining to Changes within 10 Working Days of receipt of such requests."

1.10 S CC 6.2 - CHANGE ORDER

- .1 Revise Paragraph 6.2.2 as follows: "When the Contractor, with the approval of the Consultant, and the Subcontractor agree ..."
- .2 Add new Paragraph 6.2.3 as follows: "The value of a change shall be determined by actual credits and cost to the Subcontractor. Where additional work is required, the value of the change shall be the actual cost plus a percentage covering overhead and profit, after all credits included in the change have been deducted. The following percentage fee for overhead and profit shall be applied to additional work:
 - .1 On work performed by the Subcontractor's own forces: the Subcontractor may charge a maximum of 5 percent combined percentage for overhead and profit;
 - .2 On work performed by Sub-Subcontractors, the Sub-Subcontractors may charge a maximum of 5 percent combined percentage for overhead and profit; and

- .3 On work performed by Sub-Subcontractors, the Subcontractor may charge a maximum of 5 percent combined percentage for overhead and profit on work performed by the Sub-Subcontractors."

1.11 SCC 6.3 - CHANGE DIRECTIVE

- .1 Revise Paragraph 6.3.1 as follows: Insert "... prior to the Contractor receiving the approval of the Consultant..."
- .2 Revise Paragraph 6.3.6 as follows: "The value of a change shall be determined by actual credits and cost to the Subcontractor. Where additional work is required, the value of the change shall be the actual cost plus a percentage covering overhead and profit, after all credits included in the change have been deducted. The following percentage fee for overhead and profit shall be applied to additional work:
 - .1 On work performed by the Subcontractor's own forces: the Subcontractor may charge a maximum of 5 percent combined percentage for overhead and profit;
 - .2 On work performed by Sub-Subcontractors, the Sub-Subcontractors may charge a maximum of 5 percent combined percentage for overhead and profit; and
 - .3 On work performed by Sub-Subcontractors, the Subcontractor may charge a maximum of 5 percent combined percentage for overhead and profit on work performed by the Sub-Subcontractors."
- .3 Revise Subparagraph 6.3.7.1 as follows: "... under a salary or wage schedule approved by the Contractor and the Consultant, or in the absence ..."
- .4 Revise Paragraph 6.3.12 as follows: "If the Contractor, does not have the approval of the Consultant or the Contractor and the Subcontractor do not agree ...".
- .5 Revise Paragraph 6.3.13 as follows: "When the Contractor, with the approval of the Consultant, and the Subcontractor reach an agreement on the adjustment to the Subcontract Price and to the Subcontract Time...."

1.12 SCC 6.4 - CONCEALED OR UNKNOWN CONDITIONS

- .1 Revise Paragraph 6.4.1 as follows: "... shall notify the other party and the Consultant ...".
- .2 Revise Paragraph 6.4.2 as follows: "The Contractor and the Consultant will promptly investigate such conditions and the Consultant will make a finding.... "
- .3 Revise Paragraph 6.4.3 as follows: "If the Consultant finds that the conditions ... are not materially different ... the Consultant shall report the reasons for his finding to the Contractor and Subcontractor in writing."

1.13 SCC 6.5 – DELAYS

- .1 Revise Paragraph 6.5.1 as follows: "... then the Subcontract Time shall be extended for such reasonable time as the Contractor, with the approval of the Consultant and the Subcontractor shall agree that the Subcontract Work was delayed. The Subcontractor shall be reimbursed for reasonable costs incurred by the Subcontractor as a result of such delay."

- .2 Revise Paragraph 6.5.2 as follows: "... then the Subcontract Time shall be extended for such reasonable time as the Contractor, with the approval of the Consultant and Subcontractor shall agree that the Subcontract Work was delayed. The Subcontractor shall be reimbursed for reasonable costs incurred by the Subcontractor as a result of such delay."
- .3 Revise Paragraph 6.5.4 as follows: "... unless notice in writing of claim is given to the Contractor and Consultant not later than ...".
- .4 Revise Paragraph 6.5.5 as follows: "... no request for extension shall be made as a result of failure of the Contractor or Consultant to furnish instructions ...".

1.14 SCC 7.2 - SUBCONTRACTOR'S RIGHT TO STOP THE SUBCONTRACTS WORK OR TERMINATE THE SUBCONTRACTS

- .1 Revise Paragraph 7.2.1 as follows "...terminate the Subcontract and such notice shall be provided to the Consultant."
- .2 Revise Paragraph 7.2.2 as follows: "...terminate the Subcontract and such notice shall be provided to the Consultant."
- .3 Revise Paragraph 7.2.3 to read as follows: "The Subcontractor may notify the Contractor in writing that the Contractor is in default of their contractual obligation if payment is not received as stated in Article 4 of the Subcontract Agreement - PAYMENT and the Subcontractor shall provide a copy of such notice to the Consultant"
- .4 Revise Paragraph 7.2.4 by deleting the phrase "... to the Contractor ...". Add a new Sentence to read as follows: "The Owner may remedy the Contractor's default and the Subcontractor agrees to continue to complete the Subcontract Work for the Owner or a new Contractor nominated by the Owner".

1.15 SCC 9.2 - TOXIC OR HAZARDOUS SUBSTANCES AND MATERIALS

- .1 Revise the last sentence in Paragraph 9.2.2 as follows: "The expert's report shall be delivered to the Consultant, the Contractor and the Subcontractor."
- .2 Revise Subparagraph 9.2.3.3 as follows: "extend the Subcontract Time for such reasonable time as the Contractor, with the approval of the Consultant, and in consultation with the Subcontractor ...".

1.16 SCC 9.4 - CONSTRUCTION SAFETY

- .1 Add new Paragraph 9.4.2 as follows: "Prior to commencement of the Work, the Subcontractor shall submit to the Contractor:
 - .1 Documentation of a valid Workplace Safety and Insurance Board clearance certificate and confirmation of the Subcontractor's WSIB CAD-7 performance rating.
 - .2 Documentation of the Subcontractor's insurance coverage.
 - .3 Documentation of the Subcontractor's safety-related programs for the Project.
 - .4 A copy of the Subcontractor's Form of Notification."

1.17 SCC 9.5 – MOULD

- .1 Revise the last sentence in Subparagraph 9.5.1.3 as follows: "The expert's report shall be delivered to the Consultant, the Contractor and the Subcontractor."
- .2 Revise Subparagraph 9.5.2.3 as follows: "extend the Subcontract Time for such reasonable time as the Contractor, with the approval of the Consultant, and in consultation with the Subcontractor ...".

1.18 SCC 10.1 - TAXES AND DUTIES

- .1 Add new Paragraph 10.1.3 as follows: "With respect to taxes and duties, the Subcontractor shall, at the request of the Contractor, assist, join in, or at the Contractor's expense, make application on behalf of the Contractor for any exemption, recovery or refund. The Subcontractor shall provide the Contractor with copies, or, where required original of records, invoices, purchase orders or other documentation as may be necessary to support such application."
- .2 Add new Paragraph 10.1.4 as follows: "Any amount included in the Subcontract for tax or duty, whether or not paid, which is found to be inapplicable or for which a refund is obtained shall become the sole and exclusive property of the Contractor."

1.19 SCC 10.2 - LAWS, NOTICES, PERMITS & FEES

- .1 Revise Paragraph 10.2.5 as follows: "... the Subcontractor shall notify the Contractor and Consultant in writing requesting direction immediately upon such variance or change becoming known. The Consultant will make the changes required to the Contract Documents...".
- .2 Revise Paragraph 10.2.6 as follows: "If the Subcontractor fails to notify the Contractor and the Consultant in writing; and ...".
- .3 Add new Paragraph 10.2.8 as follows: "The Contractor's and Subcontractor's compliance with statutes or regulations made thereunder or by-laws shall not relieve them of obligations set out in the Contract Documents which may be more extensive than the requirements of those statutes, regulations or by-laws."

1.20 SCC 11.1 – INSURANCE

- .1 Revise Paragraph 11.1.1 as follows: "Without restricting the generality of SCC 12.1 - INDEMNIFICATION, the Contractor will arrange for a project specific 'Wrap-up Liability' policy in the amounts of not less than \$5,000,000 per occurrence with a property damage deductible not exceeding \$5,000 on behalf of, and indemnification of the Owner, the Consultants, the Contractor, the Subcontractors, and any other parties as instructed by the Owner. The Subcontractor shall be responsible for the following insurance policies:
 - .1 "Subcontractor's Equipment Insurance covering construction machinery and equipment used by the Subcontractor for the performance of the Work. Such insurance shall be on an 'all risks' basis and be endorsed to provide the Consultant

and the Owner with not less than 30 days notice in writing in advance of any cancellation, and of any change or amendment restricting coverage.

- .2 "Automobile liability insurance in respect of licensed vehicles with limits of not less than \$5,000,000 inclusive per occurrence for bodily injury, death and damage to property, and covering all licensed vehicles owned or leased by the Subcontractor. This automobile liability insurance shall be endorsed to provide the Consultant and the Owner with not less than 30 days notice in writing in advance of any cancellation, and of any change or amendment restricting coverage. Where the policy has been issued pursuant to a government-operated automobile system, the Subcontractor shall provide the Owner with confirmation of automobile insurance coverage for all automobiles registered in the name of the Subcontractor."

1.21 SCC 11.2 - CONTRACT SECURITY

- .1 Delete Paragraph 11.2.2 in its entirety.
- .2 Add new Paragraph 11.2.3 as follows: "Those Subcontractors listed in Paragraph 11.2.5 shall provide a Performance Bond in the joint names of the Contractor and the Owner (as dual obligees) for Fifty Percent (50%) of the Subcontract Price, to assure the faithful performance of the Contract, including corrections to the Work required under GC 12.2 - Warranty; on Performance Bond Form, CCDC 221."
- .3 Add new Paragraph 11.2.4 as follows: "Those Subcontractors listed in Paragraph 11.2.5 shall also provide a Labour and Material Payment Bond in the joint names of the Contractor and the Owner (as dual obligees) for Fifty Percent (50%) of the Subcontract Price, to assure faithful payment of monies by the Subcontractor to its suppliers of labour and material ; on Labour and Material Payment Bond Form, CCDC 222."
- .4 Add new Paragraph 11.2.5 as follows: "The following Subcontractors are to provide the specified bonding:
 - .1 SC02 - Mechanical, and
 - .2 SC03 - Electrical."

1.22 SCC 12.1 – INDEMNIFICATION

- .1 Add new Paragraph 12.1.7 as follows: "The Subcontractor shall indemnify and hold harmless the Contractor, the Owner, and the Consultant, their agents and employees from and against claims, demands, losses, costs, damages, actions, suits, or proceedings (hereinafter called "claims"), suffered or incurred on account of any obligation or a provision in the Subcontract Documents, or attributable to, the Subcontractor's performance of the Subcontract. The Subcontractor assumes towards the Contractor all the obligations and responsibilities that Contractor assumes towards Owner as set forth in the Contract Documents, insofar as applicable, generally or specifically, to the materials to be furnished and the Work to be performed under this Subcontract".

1.23 SCC 12.3 – WARRANTY

- .1 Add new Paragraph 12.3.7 as follows: "Should the Work be delayed due to conditions beyond the control of the Subcontractor, the warranty period shall commence at the time of acceptance of the Work by the Owner."

END OF SECTION

Part 1 General

- 1.0 SECTION INCLUDES**
- 1.1 Precedence
 - 1.2 Relations of Trades
 - 1.3 Additional Drawings
 - 1.4 Existing Site Conditions
 - 1.5 Work within an Existing Occupied Building
 - 1.6 Construction Sequencing
 - 1.7 Temporary Construction Fencing
 - 1.8 Contractor Parking
 - 1.9 Bylaws, Permits and Approvals
 - 1.10 Organization
 - 1.11 Seismic Design Requirements
 - 1.12 Canadian Products and Local Labour
 - 1.13 Materials and Workmanship
 - 1.14 Quality Control
 - 1.15 Protection of Other Work
 - 1.16 Fastenings
 - 1.17 Supply and Install
 - 1.18 Occupation Before Completion
 - 1.19 General Requirements
 - 1.20 Coordination
 - 1.21 Access to the Project
 - 1.22 Subtrade Awards
 - 1.23 Safety Data Sheets
 - 1.24 Regulating Documents
 - 1.25 Site Superintendents and Project Managers
 - 1.26 General Contractor's Responsibilities
 - 1.27 Manufacturers' Instructions
 - 1.28 Air and Vapour Seal
 - 1.29 Fire Safety
 - 1.30 Construction Safety
 - 1.31 Independent Tests and Inspections
 - 1.32 Periodic Cleaning
 - 1.33 Temporary Protection
 - 1.34 Completion
 - 1.35 Guarantees
 - 1.36 Contingency Allowance
 - 1.37 Cash Allowances
 - 1.38 Allowances Carried in Divisions 15 and 16
 - 1.39 Schedule of Allowances
 - 1.40 Polychlorinated Biphenyl (PCB)
 - 1.41 Use of Consultant's Digital Drawings
 - 1.42 Building Dimensions
 - 1.43 Setting of the Work & Required Surveys
 - 1.44 Layout of Work
 - 1.45 Documents Required: Start, During & Close Out.

1.1 PRECEDENCE

- .1 This Section contains Articles prepared which represent the Owner standards and policies. In all cases this Section is intended to be read in conjunction with and to coordinate with all other Sections. In the case of discrepancy between this Section and other Sections to more stringent Articles of any applicable Section shall apply.

1.2 RELATIONS OF TRADES

- .1 The Contract Specifications have been generally divided into trade sections for the purpose of ready reference.
- .2 The Contractor is responsible for coordinating all trades. He is solely responsible for determining the lines of demarcation between Contractor and/or trades. Neither the Consultant nor the Owner, assume any responsibility for any such determination or for any dispute arising concerning it. No extras will be considered due to any such dispute concerning either labour or materials.
- .3 Specifications and drawings form an integral part of the Contract Documents. Any subject or item omitted from one, but which is mentioned or reasonably implied in the other, shall be considered as properly and sufficiently specified and will be part of the Work.

1.3 ADDITIONAL DRAWINGS

- .1 Consultant may furnish additional drawings to assist proper execution of the Work. These drawings will be issued for clarification only. Such drawings, however, shall have the same meaning and intent as if they were included with plans referred to in the Contract Documents.

1.4 EXISTING SITE CONDITIONS

- .1 Existing photos have been provided for convenience only. Refer to Section 02 10 00. It remains the Contractor's responsibility to examine the site during the tender period. A site meeting has been arranged as noted in the tender documents.
- .2 Ascertaining the specific site and building conditions as they relate to the project is the responsibility of the contractor. Notwithstanding this overriding responsibility the consultant has made every effort to properly represent existing site conditions as they are evident at the time of tender.
- .3 The Contractor shall assume the work site based on the existing conditions as shown on the drawings and visible on the job site at the time of the closing of the tender.

1.5 WORK WITHIN AN EXISTING OCCUPIED BUILDING

- .1 Refer also to *Section 01 35 23 – 'Site Safety Protocol for Occupied Buildings'*.
- .2 The contractor is reminded that work to these projects shall begin during the months of the active school year. Access restrictions to portions of the work apply and are outlined within this section under Construction Sequencing. Therefore, precise scheduling and

sequencing of the various work areas is required as addressed herein. Refer also to drawings for locations as described.

- .3 At all times it is the Owner of the school who is the authority responsible for the well-being of the school occupants. As such, the Contractor's Site Superintendent must establish a working rapport with the Owner or his/her designee, suitable to provide daily notification of proposed construction timing and activities.
- .4 During the occupied school year absolutely no contracting personnel are allowed in the school building during operating hours other than in those work areas designated within this Section under Construction Sequencing, or by express permission of the Owner and under the direct supervision of the Contractor's Site Superintendent.
- .5 During the school year, the General Contractor shall designate a full-time flag person to control construction traffic access and egress to any construction access points and at times as stipulated in articles in this Section and elsewhere in these specifications. Costs for compliance to execute work under these terms is to be carried by all trades as part of the base contract price.
- .6 Connection of any services must be made after hours and in such a way that it leaves no disturbance to materials or systems, nor any exposed construction conditions within the operating school area.
- .7 The General Contractor shall maintain construction fencing and hoarding and through access to fire routes at all times.
- .8 Catering trucks are not permitted on the school site whatsoever.
- .9 During the school year, the Contractor shall minimize nuisances to the school operation such as loud noise, percussion sounds from power tools, dust, odours. Due to noxious fumes, roofing and asphalt paving shall be done after hours (after 4:00 p.m., or during the weekends). Hot asphalt kettles may not be heated until after 4:00 p.m. on weekdays without prior permission from the school Owner and Owner Project Manager.
- .10 *Refer also to Section 01 52 00- 'Construction Facilities' and Section 01 56 00- 'Temporary Barriers and Enclosures'*

1.6 CONSTRUCTION SEQUENCING

- .1 Completion Dates:
 - .1 Complete the work so that the work is *Fit for Occupancy/Substantially Performed* by the required date for occupancy in the Contract.
 - .2 Following *Substantial Performance* complete deficiencies to renovations to the existing building such that project Total Completion is achieved by the required date.
- .2 Sequencing
 - .1 A detailed sequencing strategy shall be **coordinated on site for deployment of both labour and materials**, as agreed upon jointly between the owner, consultants and contractor. The sequence is briefly described in point form below:
 - .1 Mobilize on site immediately once school has finished for the summer break (July 2, 2025).

- .2 All work is to be performed during the school summer break, and completed for students to return to school on September 2, 2025.
- .3 Any unfinished work after September 1, 2025 is to be performed outside of school hours.

Contract Award to July 1, 2025

.4 ORDER Equipment and Materials

- .1 prepare shop drawings for approval immediately upon award of contract. This is especially critical in order to have windows, mechanical, electrical equipment, doors, lockers, flooring and roofing material on site and ready for installation on July 2, 2025.

July 2, 2025 to September 1, 2025

.5 Interior Renovations, Reroofing & Mechanical Upgrades

- .1 demolition and renovation to areas indicated in documents.
- .2 construction to be completed prior to new 2025 school year on September 2, 2025.

- .3 Demolition and Construction activities during the school year will be subject to noise and odour restrictions as outlined in this Section and *Section 02 41 16 – ‘Structure Demolition’*.
- .4 Coordinate sequencing with all trades and advise sub-trades of these sequencing requirements prior to the close of Tenders.

1.7 TEMPORARY CONSTRUCTION FENCING

- .1 THIS PROJECT HAS BEEN DESIGNATED AS BEING IN A BUILT-UP SUBDIVISION.
- .2 For the sake of safety to the neighbours and users of the school in which this project is being constructed, the Owner insists that fencing and hoarding be provided for every construction project, as described below.
- .3 At the locations shown on drawings, provide temporary, 6'-0" high (1.8 m) wood hoarding and chain link fencing complete with main and truck gates around entire perimeter of work area, as shown on drawings. Gates shall be locked when no work is in progress, and located as shown on the Site drawings, unless approved by the consultant.
- .4 The Owner requires that the installation of this construction fencing be accomplished as the first task of the General Contractor when he moves onto the site.
- .5 Ensure for the duration of the contract that surrounding the work site, the construction fencing, siltation fencing and man and truck gates, are provided and maintained. This fence shall be locked when no work is in progress and located as shown on the site plan drawing.

1.8 CONTRACTOR PARKING

- .1 Refer to section 01 52 00 Construction Facilities.

1.9 BYLAWS, PERMITS AND APPROVALS

- .1 Nothing indicated on the Drawings or Specifications is intended to be in conflict with any law, by-law or regulation of Municipal, Provincial, or similar Authority Having Jurisdiction.
- .2 Work of this Contract must conform with such laws, by-laws and/or regulations. Any required variation to, or deviation from, the drawings and specifications, shall be performed in accordance with the Contract contained in these specifications.
- .3 Furnish inspection certificates and/or permits as may be applicable as evidence that the installed Work conforms with laws, by-laws and regulations of Authorities Having Jurisdiction.
- .4 Each subtrade shall obtain and pay for all permits and licenses required by Municipal, Provincial, or other authorities having Jurisdiction, particular to their trade.
- .5 It is the final responsibility of the General Contractor to obtain all the required approvals and permits, with the exception of the Building Permit, which has been applied for by the Consultant and paid for by the Owner.
- .6 Any revisions or deviations to Contract Documents required by any Authorities Having Jurisdiction must be reviewed by the Consultants before implementation.

1.10 ORGANIZATION

- .1 Organize the Work of each section as required for satisfactory and expeditious completion of the Work. Take field dimensions required for the Work. Fabricate and install work to suit field dimensions and conditions.
- .2 If applicable, take into account existing work to ensure best arrangements of components in available space. Contact the Consultant prior to commencing Work in critical locations and interface with other Contractors' Work.
- .3 Provide all forms, templates, anchors, sleeves, inserts and accessories required to be installed in the Work. Set in place or instruct the applicable subtrade as to their location. Pay costs of extra work, if required, as a result of a failure to comply with these requirements at the proper time.
- .4 Before starting his work and from time to time as the work progresses, each Subcontractor shall examine the work and materials installed by the other Subcontractors insofar as it effects his own work, and the General Contractor shall promptly notify the Consultant IN WRITING, if any condition exists that will prevent any Subcontractor from giving a satisfactory result in his own work.
- .5 Should any Subcontractor start his own work without such notification, it shall be construed as an acceptance by him of all preceding work and as a waiver of all claims or questions as to its suitability for receiving his work.

1.11 SEISMIC DESIGN REQUIREMENTS

- .1 This project requires adherence to seismic design requirements as stipulated in OBC 2012, Div. B, Part 4. The General Contractor shall be responsible to coordinate all disciplines to ensure compliance with these requirements for all applicable building components.
- .2 All disciplines including Mechanical & Electrical shall make reference to individual specification section and the seismic lateral load table on Drawing S01 which outlines components requiring compliance with seismic design.
- .3 As a minimum standard, design for all connections to meet seismic forces shall be included in base bid whether specifically stated in specific specification sections or not.
- .4 Shop drawings shall clearly include seismic design compliance calculations for all building components within scope of OBC 2006, Div. B, Part 4 requirements.
- .5 Refer to Structural Drawing for a table of applicable building components and Section 13 05 41 – ‘Seismic Restraint for Non-structural Components’.

1.12 CANADIAN PRODUCTS AND LOCAL LABOUR

- .1 To the extent that the same are available and consistent with the proper economy and expeditious completion of the Contract, Canadian equipment, materials, products and other such applicable items are preferred by the Owner to be used in the Work, wherever possible and practical.

1.13 MATERIALS AND WORKMANSHIP

- .1 All materials shall be new and the best of their respective kinds, where a specific grade or brand is not indicated. Pre-packaged materials shall be delivered and stored in unopened containers.
- .2 All work performed under this Contract shall be done by mechanics skilled in their respective trades. They shall make use of such templates, jigs or special tools as may be required for the operation involved.
- .3 The acceptance of any materials or workmanship shall not be a bar to their subsequent rejection, if found defective.
- .4 Adequate, dry storage facilities shall be provided and all stored materials shall be protected from damage and theft.
- .5 All Contractors will do Work in accordance with the best industry practice of the type of work specified, unless the Contract Documents stipulate more precise requirements, in which case, the more precise requirements shall govern.
- .6 Do Work in a neat, plumb & square manner. Ensure that various work components are properly installed, forming tight joints and appropriately aligned junctions, edges and surfaces, free of warps, twists, waves, or other such irregularities.

- .7 Wherever indicated on the drawings or specifications, or in the manufacturers' / suppliers' written instructions, arrange to have manufacturers' / installer's representatives inspect the Work which incorporates their materials, products or items.
- .8 Do not permit materials to come in contact with other materials such conditions may result in corrosion, staining, discolouration or deterioration of the completed Work. Provide compatible, durable separators where such contact is unavoidable.
- .9 The design of the Work is based on the full interaction of its component parts. No provisions have been made for conditions occurring during construction. Ensure that no part of the Work is subjected to a load which will endanger its safety or which might cause permanent deformation.
- .10 Conceal pipes, ducts, conduit, wiring and other such items requiring concealment preferably in, wall or ceiling construction of all finished areas. If in doubt as to method of concealment, or intent of the Contract Documents in this regard, request clarification from the Consultant before proceeding with the Work.
- .11 Lay out mechanical and electrical work well in advance of concrete placement and furring installation to allow for proper concealment. Test and inspect Work before applying pipe covering and before it is concealed.
- .12 Provide and maintain control lines and levels required for the Work. Lay out the Work in accordance with these lines and levels and dimensions indicated on the drawings.
- .13 Verify lines, levels and dimensions and report any errors or inconsistencies on the drawings to the Consultants.
- .14 Final responsibility of satisfactory completion of all the Work, however, lies with the General Contractor.

1.14 QUALITY CONTROL

- .1 Refer also to Section 01 45 00.
- .2 The Consultants and authorized Owner staff shall have access to all areas of the Work, including any off site construction facilities.
- .3 The General Contractor shall give timely notice requesting inspection if Work is designated for special tests, inspections, or approvals by the Consultants, or any other authorized Owner staff or testing and Inspection Company.
- .4 If the General Contract covers, or permits to be covered Work that has been designated as outlined above, he shall uncover such work, have the inspections and tests satisfactorily completed and make good such work at no additional cost to the Owner.
- .5 The Consultants or the authorized Owner Staff may order any part of the Work to be examined, if such Work is suspected not to be according to the Contract Documents. If, upon examination, such work is found not to be in accordance with the Contract Documents, then the General Contractor shall correct such Work and pay for cost of examinations and correction. If such Work is found to be in full accordance with the Contract Documents, the Owner shall pay for the cost of examination and making good.

- .6 If defects are revealed during inspection and/or testing, the appointed agency may request additional inspection and/or testing to ascertain the full degree of defects. The General Contractor shall correct the defects and irregularities as reported by the inspection and/or testing agency, at no additional cost to the Owner and the General Contractor shall pay all associated costs for retesting and reinspection.
- .7 The General Contractor shall provide any tools, materials or equipment that may be required by the inspection and/or testing agencies in retesting the Work (*e.g.* Video camera rental to reinspect incorrectly installed sewer lines.)
- .8 The employment of inspection and/or testing agencies does not, in any way, affect the General Contractor's responsibility to perform the Work in strict accordance with the Contract Documents.
- .9 The General Contractor shall remove all defective work, whether the result of poor workmanship by him or his subtrades, use of defective or damaged products, whether or not incorporated into the Work and any Work that has been rejected by the Consultants or authorized Owner Staff as failing to conform to the Contract Documents. Replacement and execution of the affected Work shall be done in full accordance with the Contract Documents, making good other trades' work damaged by such removals or replacements at no additional charge to the Owner.
- .10 If, in the opinion of the Consultant and/or the authorized Owner Staff, it is not expeditious to correct the defective Work, or Work not performed in accordance with the Contract Documents, the Owner, may, at its sole discretion, deduct from the Contract Price, the difference in value between the work performed and that required by the Contract Documents, the amounts of which shall be determined by the Consultant.
 - .1 The notable exception to the above item is a faulty installation of base and asphalt paving. If, the inspection agency, after performing random test holes to determine compaction and thickness of sub base, base and asphalt, determines that either one or both, are not according to what was specified in the Contract Documents, the Owner will not accept credits for such inconsistencies but rather, demand that any such installation be removed and redone in its entirety, at the pleasure and convenience of the Owner, but within the first year of the warranty period.

1.15 PROTECTION OF OTHER WORK

- .1 Each trade shall avoid damage to other trades and shall take all measures necessary and provide all masking and materials necessary, to provide adequate protection.
- .2 Each Subcontractor shall be held responsible for all damage to work installed by others that is caused by this work or by anyone employed by him.
- .3 Patching and repairing of damaged work shall be done by the Contractor who installed the work, as directed by the Consultant, but the cost of same, shall be paid for by the Contractor who is responsible for the damage.

1.16 FASTENINGS

- .1 All fastenings must be permanent, of same metal, or compatible with any metals with which they are in contact, of adequate size and spacing, to ensure permanent anchorage against load or shear.
- .2 Exposed fastenings must be evenly spaced, neatly laid out and must not mar surfaces of prefinished materials.
- .3 No ram-setting or similar techniques will be permitted, without prior written approval of the Consultant.

1.17 SUPPLY AND INSTALL

- .1 Unless specifically noted, “*supply only*”, any reference to supply intends the **supply and installation** of material or item so noted.

1.18 OCCUPATION BEFORE COMPLETION

- .1 If the General Contractor, for any reason, does not have the Project completed by the specified completion date and the Owner, of necessity, is forced to occupy any part of the building before the whole of the Work is completed, the Contractor will not be entitled to any indemnity for interference with his operation.

1.19 GENERAL REQUIREMENTS

- .1 All Contractors shall examine carefully all drawings and specifications to inform themselves fully of all conditions and limitations pertaining to the work of the contract.
- .2 All Contractors shall co-operate and co-ordinate their work for the proper completion of the work, including co-ordination of delivery dates and commencement of subtrades work.
- .3 The responsibility and costs for all work, including temporary structures, shoring, shoring design (if applicable) and erection shall at all times rest with the General Contractor and his Subcontractors. The Consultant will review construction methods and shop drawings for general arrangements only. The method of obtaining the results contemplated by the Contract Documents shall be determined by the General Contractor.
- .4 The undertaking of period site review by the Consultant or Owner Representative shall not be construed as supervision of actual construction, nor make them responsible for providing a safe place for work, visit, use, access, travel, or occupancy of the Consultant’s or Owner’s employees or agents.
- .5 The General Contractor shall be fully responsible for coordinating and expediting the work of all Subcontractors and shall employ the necessary and qualified personnel to provide the required quality of labour and materials and to prevent delays in the progress of the project. Each trade shall be afforded all reasonable opportunities for the installation of its work and for the storage and handling of its materials.

1.20 COORDINATION

- .1 The General Contractor shall coordinate all work and preparation on which subsequent work depends to facilitate mutual progress, and to prevent any conflict.
- .2 The General Contractor shall ensure that each trade makes known, for the information of the General Contractor and other trades, the environmental and surface conditions required for the execution of its work; and that each trade makes known the sequence of others' work required for installation of its work.
- .3 The General Contractor shall ensure that each trade, before commencing work, knows the requirements for subsequent work and that each trade is assisted in the execution of its preparatory work by trades whose work depends upon it.
- .4 The General Contractor shall ensure that shop and layout drawings, templates, and all information necessary for the location and installation of materials, openings, inserts, anchors, accessories, fastenings, connections and access panels are provided by each trade whose work requires cooperative location and installation by other trades and that such information is communicated to the applicable installer.
- .5 The General Contractor shall ensure that delivery of materials supplied by one trade to be installed by another is well before the installation begins.
- .6 The General Contractor shall inform all trades that giving installation information in error, or too late to incorporate in the work, shall be responsible for any extra work caused thereby, unless impractical and where required, cutting shall be done by each respective trade, and patching shall be done by the general contractor.

1.21 ACCESS TO THE PROJECT

- .1 The General Contractor for this Work shall, at all times allow the Consultants, the Owner, or any other Owner commissioned contractor or their employees, access into the building or around the premises, undisturbed, whether union or non-union, as may be required in the execution of other portions of the building work and installation of equipment, etc.
- .2 The General Contractor shall cooperate fully with any and all Owner commissioned Contractors.

1.22 SUBTRADE AWARDS

- .1 The Contractor shall, on notice of award of the contract, obtain the Consultants approval of a complete list of all persons or firms to which he proposes to sublet any part of the work, the trades or divisions of work which are to be sublet to each, and the amount of each trade. The General Contractor shall provide to the Consultant a financial breakdown showing all divisions of the work amounting to the full sum of the contract. Mechanical and Electrical trades shall be further broken down as specified in Divisions 26 and 33.

1.23 SAFETY DATA SHEETS

- .1 The General Contractor shall ensure that the following material and safety data sheets are submitted prior to commencing installation and application of at least the following:

- .1 Lead-free solder
 - .2 Resilient flooring
 - .3 Painting and finishing
 - .4 Fertilizers
 - .5 Glues and adhesives
 - .6 Pesticides
 - .7 Herbicides
 - .8 Any other product which may give off air borne particles after installation.
 - .9 Sealants and caulking
- .2 The General Contractor and all of his Subcontractors must note that specifically, Asbestos and Asbestos containing materials solder for piping containing lead, and Painting & Coatings containing lead and/or mercury must be excluded from any part of the Work.
 - .3 Contractor The General must submit Certificates of Compliance, prior to the application for Substantial performance, for each of the following items:
 - .1 An affidavit relative to the use of Lead-free solder for all domestic water lines, regardless of location.
 - .2 Products for which Material Safety Data Sheets have been submitted and accepted.
 - .3 Other Work/Products identified in the Contract Documents as requiring a Certificate of Compliance.
 - .4 Each Certificate of Compliance must indicate names and addresses of the project, the Owner, the date of Issue, produce description including name, number, manufacturer, with a statement verifying that the Work/Product installed meets specified requirements and, if applicable, complies with the submitted and accepted Material Safety Data Sheets.
 - .5 Each Certificate of Compliance must be issued on the trade's letterhead, properly executed, under whose work the respective Work/Product has been provided.
 - .6 Each Certificate of Compliance must be endorsed by the General Contractor with his authorized stamp/signature.
 - .7 The Completion Security Account will not be paid to the Contractor without submission of all required affidavits and requested material and safety data sheets.

1.24 REGULATING DOCUMENTS

- .1 The General Contractor and all of his Subcontractors, Suppliers/Installers etc., must conform to the latest editions in force at the time of tender of each and all of the following: Ontario Building Code, Canadian Electrical Code (CEC), The Occupational Health and Safety Act, Ontario, the National Fire Code, the local Municipal Fire Code, and all other applicable Codes and Building By-Laws. All must also conform to the requirements of the Authorities Having Jurisdiction, such as Public Utilities. Where required under the Occupational Health and Safety Act, engage a Professional Engineer to design hoarding, scaffolding and shoring, formwork and falsework for concrete.

- .2 Contract forms, codes, standards and manuals referred to in these specifications are the latest published editions at the date of close of tenders. The General Contractor and all of his Subcontractors, Suppliers/Installers must meet or exceed the requirements of specified standards.
- .3 Provide, on site, copies of documents referred to in the Specification for joint use of Contractor and Consultant.

1.25 SITE SUPERINTENDENTS AND PROJECT MANAGERS

- .1 It is the requirement under the work to this Contract that the Contractor provide on-site, full-time, *Site Superintendent* for the entire project duration through to the end of Deficiency completion. Superintendent shall have qualifications of previous experience with similar projects. Superintendent shall remain assigned full time to the project until completion of all deficiencies. This is a base bid requirement and the Contractor shall include this cost in the Tender Amount.

1.26 GENERAL CONTRACTOR'S RESPONSIBILITIES

- .1 The list of General Contractor's responsibilities identified below is by no means comprehensive, nor is it in any priority or critical order. It is here, merely to identify the most often forgotten or ignored responsibilities of the General Contractor and is reproduced only as a reminder. The Consultants and the Owner advise the General Contractor that it is he who is responsible for all aspects and facets of the Project, from start to completion, from compliance with Occupational Health and Safety regulations to compliance with all codes and statutes.
 - .1 The General Contractor will be responsible to take all necessary steps to protect personnel (workers, visitors, general public, etc.) and property from any harm during the course of the contract.
 - .2 All equipment shall be in safe operating condition and appropriate to the task.
 - .3 Only competent personnel will be permitted on site. During the site introduction, *only the Consultant* will determine who is competent. The General Contractor will cause to remove from the site any persons not observing or complying with safety requirements.
 - .4 The General Contractor shall comply with, and shall ensure that all of his Subcontractors, Suppliers, Installers etc., comply with all Federal, Provincial and Municipal Safety Codes and Regulations and the Occupational Health and Safety Act.
 - .5 The General Contractor shall supply competent personnel to implement his safety program and ensure that all Subcontractors comply with the Owner's standards, and those of the Occupational Health and Safety Act.
 - .6 The Owner will provide periodic monitoring to ensure that safety requirements are met, and that safety records are properly kept and maintained. Continued disregard for safety standards can cause the Contract to be canceled and the General Contractor removed from the site.
 - .7 The Owner may hire Commissioners to perform inspections of building systems at the closing stages of the work of this contract. If so contracted and identified in the *Instructions to Bidders*, the General Contractor shall cooperate with and coordinate the work of the Owner's Commissioners on site.

- .8 The General Contractor will report to the Owner and Jurisdictional Authorities any accident or incident involving personnel and/or property of the Contractor, Owner, or Public, arising from the General Contractor's or any of his Subcontractors' execution of the work.
- .9 The General Contractor will include all provisions of this contract in any agreement with Subcontractors, and hold them equally responsible for safe work performance.
- .10 If the General Contractor is responsible for a delay in the progress of the work due to an infraction of legislation or Owner Health and Safety requirements, the Contractor will, without additional cost to the Owner, work such overtime, and acquire and use for the execution of the work such additional labour and equipment as to be necessary in the sole opinion of the Owner's Representative and Consultant, to avoid delay in the final completion of the work or any operations thereof.

1.27 MANUFACTURERS' INSTRUCTIONS

- .1 Unless otherwise specified, the General Contractor and all his Subcontractors shall comply with manufacturer's latest printed instructions for materials and installation methods.
- .2 The General Contractor shall notify the Consultant in writing of any conflict between the Specifications and Manufacturer's Instructions and have same clarified.

1.28 AIR AND VAPOUR SEAL

- .1 The General Contractor shall ensure that exterior walls, windows, floor and roof surfaces provide an air-tight and vapour-tight membrane to prevent problems due to building vapour migration.
- .2 In general, the air/vapour barrier must be achieved on the interior side of the thermal insulation.

1.29 FIRE SAFETY

- .1 The General Contractor and all of his Subcontractors must comply with requirements of standard for Building Construction Operations FC No. 301-1982, issued by the Fire Commissioner of Canada.
- .2 The appropriate clauses of the Ontario Building Code relating to fire protection shall be strictly followed.
- .3 The General Contractor shall provide and maintain free access to temporary or permanent fire hydrants acceptable to local fire department.

1.30 CONSTRUCTION SAFETY

- .1 Refer also to *Section 01 35 23 – 'Site Safety Protocol for Occupied Buildings'*
- .2 The General Contractor and all his trades must observe and enforce construction safety measures required by Canadian Construction Safety Code, Workplace Safety & Insurance Owner, and Municipal statutes. In particular, the Ontario Construction Safety

Act, the regulations of the Ontario Department of Labour and Ontario Hydro Safety Requirements shall be strictly enforced. In event of conflict between any provisions of above authorities the most stringent provisions will apply.

- .3 The General Contractor is reminded, once again, that it is he who is responsible for Occupational Health and Safety on this Project. The items listed below are only guidelines of the Owner's expectations in this regard and not to be construed to be comprehensive or total in nature.
- .4 The Owner will take every reasonable precaution to prevent injury or illness to students, employees and the public, participating in Owner activities, or performing their duties. This shall be accomplished by providing and maintaining a safe, health working environment by providing the education necessary to perform these activities or duties safely.
- .5 The Owner is vitally interested in the health and safety of all Contractors and their workers performing work for the Owner. Cooperation and support of the General Contractor in the protection of workers from injury or occupational disease is a major, continuing object of the Owner. To achieve these goals, the Owner, in concert with the Contractors, will endeavor to make every effort to ensure that the Contractors provide a work site which is a safe and healthy work environment. The Owner insists that all Contractors and their workers are dedicated to the continuing objective of reducing risk and injury.
- .6 The General Contractor covenants and agrees to comply with all statutory and other obligations, including, without limitation, the provisions of the Occupational Health and Safety Act (Ontario) and all Regulations thereto, and all amending and successor legislation, including without limitation, Bill 208 (the "Act") in connection with all work performed by either the Contractor, Subcontractors, or any Other Contractor on, or in connection with, the Project.
- .7 Without limiting the foregoing, for the purposes of this Contract, the General Contractor agrees that **he** shall be the "constructor" of the Project within the meaning of the Act, and as such, shall assume all the obligations and responsibilities, and observe all construction safety requirements and procedures, and duties of inspection imposed by the Act on the "constructor", as therein defined, for all work and services performed by the General Contractor, Subcontractors and Other Contractors on or in connection with the Project.
- .8 The General Contractor further covenants and agrees that the Owner and its existing and former officers, trustees, employees and agents, and their respective heirs, executors, administrators, successors and assigns (hereinafter collectively referred to as the "Owner") shall be released from any obligations or liabilities otherwise imposed on the Owner, or on any of them, pursuant to the Act in connection with the Project, and that the General Contractor shall assume all liability and responsibility in connection with same.
- .9 The General Contractor agrees to save harmless and indemnify the Owner from any losses, damages, costs and expenses of any kind, or nature whatsoever, including all legal expenses, and all defense costs and related expert or consulting fees, incurred by the Owner, or any of them, arising in connection with the failure, default, or inability of the General Contractor of the Owner, or any of them, to comply with any of the aforementioned statutory, or other legal requirements, or arising in connection with any

- breach by the General Contractor of any of its covenants, agreements and obligations under this Contract.
- .10 The General Contractor shall inform and instruct Other Contractors that they, while performing work on this project, are under the authority of the Contractor. Other Contractors are to discuss and co-ordinate with, and follow instructions from, the General Contractor on all matters of site access, vehicles, deliveries, storage, temporary facilities, coordination with the work of other subcontractors, work methods, scheduling, labour conditions, construction safety, environmental protection, security and all other matters which relate to the safe and proper execution of construction work.
 - .11 The General Contractor shall ensure that all supervisory personnel on job site are fully aware of the procedures and requirements outlined above and comply with all requirements specified.
 - .12 All Contractors are responsible to ensure that all machinery and/or equipment are/is safe and that the workers perform their tasks in compliance with established safe work practices or procedures. Workers must receive adequate training in their specific work tasks to protect their health and safety.
 - .13 The General Contractor shall be responsible for all persons and companies performing work, including Other Contractors, on this project, at all times, up to and including, the date of Substantial Performance of the Work. Authority for coordination and instructions relating to all matters which relate to the safe and proper execution of construction work shall rest with the General Contractor. The Contract Price must include the General Contractor's fees for the coordination and supervision of the work of all Other Contractors.
 - .14 In addition to the responsibility of all contractors as outlined above, Subcontractors will be held accountable for the health and safety of workers under their supervision.
 - .15 Every worker must protect his/her own health and safety by working in compliance with the law and with safe work practices and procedures established by the authorities having jurisdiction.
 - .16 All sections of the Occupational Health and Safety Act for Industrial Establishments, latest edition, and the Occupational Health and Safety Act for Construction projects, latest edition, shall be enforced, by the General Contractor, in their entirety, throughout the duration of the construction project.
 - .17 The General Contractor shall provide the Consultant with the telephone number where the General Contractor or his representative can be reached at any time, day or night, for the duration of the contract.
 - .18 Where an accident, explosion, or fire causes a person injury at the work place, and the worker is disabled from performing the usual task, the General Contractor shall prepare a written notice and shall forward same to the Ministry of Labour within four days of the occurrence with a copy to the Owner's Representative, who shall copy and inform the Owner's Supervisor of Health and Safety and/or the Owner's Joint Health and Safety Committee, containing such information and particulars as may be described.

- .19 Where a person is killed or critically injured from any cause at the work place, the General Contractor shall immediately call the Ministry of Labour. A written notice from the General Contractor shall be given to the Ministry of Labour within forty-eight hours after the occurrence, containing such information and particulars as may be prescribed, with copies to the Architect and the Owner's Representative.
- .20 The General Contractor is advised that the accident scene is under the jurisdiction of the Ministry of Labour and no wreckage, articles, etc., shall be interfered with, disturbed, destroyed, altered or carried away at the scene, or connected with the occurrence, until the Ministry of Labour has given permission.

1.31 INDEPENDENT TESTS AND INSPECTIONS

- .1 The Contractor shall appoint inspection firms as directed by the Consultant and make payments from the cash allowances specified in Division noted, except for the following, which shall be included in the contract:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Testing, adjustment and balancing of mechanical and electrical equipment and systems.
 - .4 Mill tests and certificates of compliance.
 - .5 Re-testing as already described in *Quality Control* of this Section.
- .2 The Consultant will authorize payment of inspection services from specified cash allowances.
- .3 The General Contractor shall furnish labour and facilities to:
 - .1 Provide access to work to be inspected and tested.
 - .2 Facilitate inspections and tests.
 - .3 Make good work disturbed by inspection and test.
 - .4 Pour concrete test cylinders and store as directed by Inspection Firm.
- .4 The General Contractor shall notify Inspection Firms sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.
- .5 Where materials are specified to be tested, the General Contractor shall deliver representative samples in required quantity to testing laboratory.

1.32 PERIODIC CLEANING

- .1 Refer also to Section 01 74 11.
- .2 As part of the Tender, the General Contractor shall provide all necessary garbage bins through the duration of the project. The General Contractor shall ensure that the following is accomplished:

- .1 Keep all areas of the Work clean and orderly, free from accumulation of dirt, debris, garbage, oily rags, excess material, or such other trash items. Remove such items for all areas of the Work on a daily basis.
 - .2 Vacuum and/or broom interior building areas when ready to receive painting and other finishes. Continue cleaning on an “as needed” basis until the building is ready for inspection and takeover.
 - .3 Schedule cleaning operations so that resulting dust and other contaminants do not affect wet, newly painted surfaces.
 - .4 In preparation for Substantial Performance and Occupancy, conduct inspections of all exposed interior and exterior surfaces.
 - .5 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from all exposed interior and exterior finishes, including glass and other polished surfaces.
 - .6 Remove all protective film from switch plates and hardware, particular kick plates.
 - .7 Clean lighting reflectors, lenses and other lighting surfaces.
 - .8 Broom clean paved surfaces and rake clean other disturbed surfaces in the area of the Work, to remove site debris caused by the Work of this Contract. Inspect for damages and make good.
 - .9 Remove debris and surplus materials from the roof areas and accessible concealed spaces.
 - .10 Replace heating, ventilation and/or air conditioning filters through the entire building to the extent that they supply or return from the work areas, whether or not, the units were operated during construction operations.
 - .11 Refer to “cleaning” sections of the specifications for additional specific periodic and final clean up requirements.
- .3 The General Contractor must note the Owner insists that tiled (VCT) and sheet good floors (vinyl or linoleum) be broom swept only. Wet mopping and waxing/polishing will be done by the Owner’s Caretaking Staff.
 - .4 Do not provide sealants and waxes on terrazzo, ceramic and other hard surfaced floors without reviewing products and methods of application with the Owner’s Caretaking Staff. Failure to comply with this requirement will result in the contractor stripping these floors in their entirety.
 - .5 The contractor shall also ensure that the appropriate measures including a stone mud mat are installed and maintained at all construction entrances, to avoid contamination of City roads and sewers. It is the Contractor’s responsibility and not the Owner’s to ensure that site entrances and roadways in front of the site are maintained in clean condition acceptable to the municipality or Subdivision Engineer, as the case may be for un-assumed subdivisions.

1.33 TEMPORARY PROTECTION

- .1 Refer also to Articles 1.8, in this Section.
- .2 The General Contractor to provide temporary dustproof and fire resistant barricades, screens or barriers to separate all work areas from other parts of the building and/or as directed by the Consultant and/or authorized Owner Representative, for the safety of

- persons, or for dividing the Work from portion or portions of the building or site that may be required for use by the school, or others.
- .3 Properly protect the Work from any damage by the elements. In cold weather cover all exterior openings in the work areas likely to cause water damage.
 - .4 During off hours and/or stages of suspended operations for whatever reasons, the General Contractor must assume all responsibility for protection against the elements, theft and/or vandalism. This applies to all work in progress and to any materials, products, tools, equipment, or other such items left at the work site.
 - .5 Properly protect floors and roofs from any damage. Take special precautions when moving heavy loads or equipment over floors and roofs.
 - .6 The General Contractor must keep floors free of oils, grease or other such materials likely to discolour them and/or affect bonding of applied surfaces.
 - .7 The General Contractor must ensure that no part of the Work is loaded greater than it was designed for, when completed. Make any temporary support as strong as the permanent support. Place no load on concrete structure until it has sufficient strength to safely bear such load.
 - .8 Protect glass and other finishes against heat, slab and weld splatters, using appropriate protective shields and covers.
 - .9 The General Contractor must provide and maintain, in good working order, appropriately labeled ULC fire extinguishers, to the approval of Authorities Having Jurisdiction.
 - .10 The General Contractor must provide a minimum of two safety helmets on site at all times for the use of the Consultant and any other Owner authorized visitors to the site. It is the General Contractor's responsibility to make certain that any such visitors wear the protective headgear and any other safety gear which may be necessary at that particular time of construction.

1.34 COMPLETION

- .1 Upon completion of the Work, all protection erected shall be removed, all damage to the Work and adjoining Work due to the lack or failure of such protection shall be made good and all debris, surplus materials tools equipment shall be removed from the work areas and the site, and the Project shall be left clean and tidy to the full and complete satisfaction of the Consultant and Owner Staff. The General Contractor shall give written notice to the Consultant, requesting final inspection of the completed Project.
- .2 Refer to the pertinent sections of the Specifications for requirements with respect to submission of *Record Documents, Maintenance Materials, Special Tools and Spare Parts*.

1.35 GUARANTEES

- .1 The following is a summary of the guarantees (in number of years) required by the contract. Refer to individual specifications sections for additional information on

warrantees. In the event an extended warranty is listed in the specific Section, that section will have precedence over this list. If no extended warranty is listed, this list will govern:

.1	General Contract	1
.2	Finish Carpentry	2
.3	Caulking	2
.4	Finish Hardware	3
.5	Panic Devices and Door Closers	5
.6	Acoustic Ceilings	2
.7	Built Up Roofing (installation)	2
.8	Built Up Roofing (manufacturer's)	10
.9	Sheet Metal Flashing and Siding	5
.10	Concrete Floors	3
.11	Ceramic Tile	5
.12	Resilient Tile	3

- .2 The guarantee period shall start on the date of issue of the Certificate of Substantial Performance of the Contract by the Consultant.

1.36 CONTINGENCY ALLOWANCE

- .1 No Contingency Allowance is to be included in the Base Bid.

1.37 CASH ALLOWANCES

- .1 Include in the Cost Plus Fee Bid, a Cash Allowance in the amount of **One Hundred thousand dollars, (\$100,000.00) not including HST.**
- .2 Cash Allowances, unless otherwise specified, cover the net cost to the General Contractor of services, products, construction, machinery and equipment, freight, handling, unloading, storage installation and other authorized expenses incurred in performing the Work.
- .3 The Contract Price, *and not the Cash Allowance*, includes the General Contractor's profit and coordination costs in connection with all Cash Allowance expenditures.
- .4 The Contract Price will be adjusted by written order by the Consultant to provide for an excess or deficit to each Cash Allowance. Any unused portions of these allowances shall be returned to the Owner on the conclusion of the Contract.
- .5 A schedule shall be prepared jointly by the Consultant and the General Contractor to show when items called for under Cash Allowances, so that the progress of the Work is not delayed.
- .6 Exclusive of Deposits, which are the contractor's sole responsibility to provide as required of Authorities Having Jurisdiction, the following is a summary of the scope Cash Allowances to be included in the contract:

- .7 Expend both Cash Allowances as directed by the Consultant in writing. Allowances will be adjusted to actual cost with no adjustment to Contractor's charges. Cash expenditure must identify the H.S.T. separately.
- .8 Cash Allowance Breakdown of Items
 - .1 Testing and Inspections (requested by Consultant, Owner or imposed by Authorities)
 - .2 Finish Door Hardware Supply and Installation
 - .3 Window shades where required (all existing shades are intended to be removed and reinstalled in base contract)
 - .4 Interior signage (if required - supply and install)

1.38 ALLOWANCES CARRIED IN DIVISIONS 15 AND 16

- .1 Refer to Divisions 15 and 16 for any additional Cash Allowances to be carried by the Sub-Contractor.

1.39 SCHEDULE OF ALLOWANCES

- .1 Material Allowances shall include the following:
 - .1 Net cost of Material
 - .2 Applicable taxes and duties
 - .3 Delivery to site
- .2 For Material Allowance, the contract shall include:
 - .1 Handling at site, including unloading, uncrating, storage and hoisting
 - .2 Protection from elements, from damage
 - .3 Labour, installation and finishing
 - .4 Other expenses required to do cash allowance work (i.e. contract co-ordination)
 - .5 Overhead and profit
- .3 Material and Installation Allowances shall include the following:
 - .1 Net cost of material
 - .2 Applicable taxes and duties
 - .3 Deliver to site
 - .4 Handling at site, including unloading, uncrating, storage and hoisting
 - .5 Labour, installation and finishing

1.40 POLYCHLORINATED BIPHENYL (PCB)

- .1 Conform to the Environmental Protection Act and Regulations, Ontario Regulation 11/82 as amended.

1.41 USE OF CONSULTANTS'S DIGITAL DRAWINGS

- .1 Where a contractor wishes to obtain a digital copy of consultant drawings for shop drawings or survey purposes, the consultant may elect to provide this drawing for a nominal fee. As this is the consultants' option, the contractor shall not anticipate provision of these digital drawings to meet the contract schedule.

1.42 BUILDING DIMENSIONS

- .1 Ensure that all necessary job dimensions are taken and all trades are co-coordinated for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of such dimensions, and for co-ordination.
- .2 Verify that all work, as it proceeds, is executed in accordance with dimensions and positions indicated which maintain levels and clearances to adjacent work, as set out by requirements of the drawings, and ensure that work installed in error is rectified before construction resumes.
- .3 Check and verify all dimensions referring to the work and the interfacing of all services. Verify all dimensions, with the trade concerned when pertaining to the work of other trades. Be responsible to see that Subcontractors for various trades co-operate for the proper performance of the Work.
- .4 Avoid scaling directly from the drawings. If there is ambiguity or lack of information, immediately inform the Consultant. Be responsible for any change through the disregarding of this clause.
- .5 All details and measurements of any work which is to fit or to conform with work installed shall be taken at the building.
- .6 Advise Consultant of discrepancies and if there are omissions on drawings, including layout of items which affect aesthetics, or which interfere with services, equipment or surfaces. DO NOT PROCEED without direction from the Consultant.
- .7 Prepare interference drawings AND SUBMIT AS SHOP DRAWINGS IN ADVANCE OF PRODUCTION to properly co-ordinate the work in all ceiling spaces and where necessary. Coordinate these drawings with all Divisions. Refer also to Section 013300.

1.43 SETTING OF WORK AND REQUIRED SURVEYS

- .1 As part of the base tender amount, provide and pay for the services of a Land Surveyor acceptable to the Consultant, registered in the Province of Ontario to establish the property boundaries and the location of the site alternations.
- .2 Lay out building lines for the work and provide substantial stakes or monuments to preserve lines and levels.
- .3 Verify on the site all grades, lines, levels, dimensions and location of hydrants, existing structures, manholes, overhead and buried utilities, existing trees, roadways, sidewalks and the like, shown on the drawings, and report omissions, errors, or inconsistencies, before commencing work.
- .4 Upon completion of layout work and before commencement of any excavation, give ample notification to allow for inspection of lines and levels. Such inspection does not in any way mitigate the Contractor's responsibility for accuracy of layout.
- .5 Provide the consultant with a Surveyor's Certificate describing the location of all perimeter foundation walls relative to property lines before construction proceeds on those walls.

1.44 LAYOUT OF WORK

- .1 Layout work with respect to the work of all trades. Arrange mechanical and electrical work such as piping, ducts, conduits, panels, equipment and the like to suit the architectural and structural details.
- .2 Alterations necessary due to conflict and interference between trades, to be executed at no cost to the Owner unless notification is given in writing before Tender Closing Date.

1.45 DOCUMENTS REQUIRED AT START, DURING & CLOSE-OUT OF CONSTRUCTION

- .1 At Commencement of Contract
 - .1 Supply Performance Bond and Labour and Material Bond, in accordance with Section 00 21 13, Instructions to Bidders.
 - .2 Supply Public Liability and Property Damage Insurance Certificates, also Builder's Risk and Boiler Insurance as required of the Contract.
 - .3 Supply Certificates of good standing from WSIB for the General Contractor and all Subcontractors.
 - .4 Supply a complete Contract Sum Breakdown of all subtrades or parts of work and general expense items for approval by all consultants. Include Mechanical and Electrical Breakdowns for review and acceptance by Consultants.
 - .5 Supply a competent detailed Construction Schedule that has been reviewed and approved by major subtrades. Identify critical milestone dates for Addition, Renovations and Sitework.
 - .6 Supply Cash Flow schedule of monthly progress payments in coordination with the Construction Schedule and plot as 'S' curve chart.
 - .7 Supply Schedule of Shop Drawing Submissions and identify list of long-lead items.
 - .8 Apply for and post and supply a copy of Notice of Project.
 - .9 Supply a copy of Health & Safety policy as well as post at the job site.
 - .10 Supply Shoring Designs of all load bearing areas if any required of the construction sequence or if required by the Structural Engineer.
 - .11 Supply interference drawings for all areas requested by the Architect, Mechanical Engineer or Electrical Engineer.
- .2 During Construction
 - .1 Maintain as-built record drawings in clean condition.
 - .2 Organize regular Trade Coordination meetings.
 - .3 Organize separate, regular Owner and Consultant Job Meetings in accordance with Section 012200.
 - .4 Maintain a copy of up to date records on site including, but not limited to Permit Sets, Contract Documents updated with all addenda, all Changes and Supplementary Instructions issued by Consultants.
- .3 Monthly with Each Progress Payment Application
 - .1 Supply Monthly Progress Reports and Construction Schedule in accordance with Section 012200.

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- .2 Adjust Allowances, as required.
 - .3 Current WSIB Form
 - .4 Confirm that payments are being made to subcontractors and suppliers by submission of original copies of the current versions of Statutory Declarations with the second and subsequent Progress Payment Application. Include both Statutory Declarations Form CCDC-9A for the General Contractor and CCDC-9B from subcontractors with each monthly Progress Payment Application. No payment will be made for unincorporated material on the site, unless Bill of Sale in proper format is provided.
- .4 Prior to Substantial Completion
- .1 Provide detailed Completion Schedule a minimum of 90 days prior to Substantial Completion. Schedule to illustrate all trades and sequences required for completion and legal occupancy. Issue to Consultants and upon acceptance, to all trades.
 - .2 Coordinate Completion Schedule with Building Commissioner at least 60 days prior to substantial completion or as directed by Consultant.
 - .3 Prior and as a requirement of owner acceptance of Substantial Completion of the work the following to be observed, executed and submitted:
 - .1 DEFICIENCIES ARE LISTED: prior to Substantial Completion, the contractor shall prepare a room by room deficiency list in electronic format on an MS Excel spreadsheet provided by the Consultant. Contractor shall print and review on site with consultants at a site meeting and post on each room or area. Contractor shall reissue back to Consultant, when updated, in Excel electronic format. This list will be acted upon by all trades and coordinated and updated weekly as a minimum by the General Contractor to ensure all deficiencies are addressed by the date required for Total Performance. Confirm in writing to the Architect when and on what dates each deficiency has been completed in a satisfactory manner. The Consultant's site review will be final approval.
 - .2 Acceptable preliminary submissions of all Mechanical and Electrical Operations and Maintenance Manuals have been reviewed by Consultants.
 - .3 Acceptable preliminary submissions of all Warranty and Shop Drawing Records have been reviewed by Consultants.
 - .4 All final clean-up to have been executed, as specified in Section 01 74 11.
 - .5 Complete preliminary balancing and provide preliminary Balancing Reports.
 - .4 Failure to comply with these requirements shall have amounts withheld on Progress Payments and delay issuance of Certificate of Substantial Completion.
 - .5 Note that Prior to the Release of Holdback, a similar Progress Claim is required, and must include current Statutory Declaration Forms CCDC-9A for the General Contractor and CCDC-9B from subcontractors updated to refer to the Previous Certificate of Payment.
- .5 Upon Completion (Refer also to 01 78 00 Close-Out Submittals)
- .1 Upon completion of work before the Final Certificate of Payment is issued, the following to be observed, executed and submitted:

- .2 DEFICIENCIES ARE COMPLETE. Confirm in writing to the Architect when and on what dates each deficiency has been completed in a satisfactory manner. The Consultant's site review will be final approval.
- .3 Finishing Hardware, Inspection and Verification. Note requirements for qualified installation and inspection in Section 08 71 10- Door Hardware. Inspection only is paid for from Cash Allowances.
- .4 Organize a Final Inspection tour at which to be present: the Owner's authorized representative; the Architectural, Structural, Mechanical and Electrical Consultants, and their supervisory personnel, if any; the Contractor and his superintendent.
- .5 Where the above procedure is impossible or where any deficiencies remain outstanding, the Owner's representative and the Consultant concerned, to inspect and accept the affected work and/or material upon notification by the Contractor, that all deficiencies involving this Consultant have been made good.
- .6 A complete release of all liens arising out of this Contract, other than his own. If a subcontractor or supplier refuses to furnish a release of such a lien, furnish a bond satisfactory to the Owner to indemnify him against any claim under such a lien.
- .7 Certificates of good standing from the WSIB, for the General Contractor and all Subcontractors.
- .8 All reference records, as specified, under Section 01 78 00.
- .9 Certificate of Inspection from Mechanical and Electrical Engineers.
- .10 Copies of all Lists of Deficiencies with each Deficiency verified when complete by only this project's job Superintendent. The Final List of Deficiencies to be signed, completed by all concerned, if accepted.
- .11 Statement of Completion from General Contractor.
- .12 Final adjustment of all Allowances.
- .13 Certificates required by Provincial, Municipal and other authorities having jurisdiction. Including signed Building Permit.
- .14 Final Balancing Reports showing completed adjustments
- .15 2 sets of marked up prints of complete Architectural, Structural, Mechanical and Electrical drawings in addition to the digital copies required below.
- .16 Digital copy of Site Services, Architectural, Structural, Mechanical and Electrical and 2 sets As-Built Drawings – paid from Cash Allowance.
- .17 As-Built Survey by O.L.S. (2 copies and diskette) – paid from Cash Allowance. Survey to include detailed spot elevations and include elevations at tops of all CB's & MH's, all invert elevations (engage private locate firm as required), elevations at bottoms of curbs, elevations at all corners of building.
- .18 Final copies of all Maintenance Manuals.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3	Execution
3.1	NOT USED
.1	Not used.

END OF SECTION

Part 1 General

1.1 PROJECT DESCRIPTION

- .1 Work of the Contractor package and several separate Subcontract packages to be performed under a single Cost Plus Contract comprises the Project, Construction of the:

Renovations to Ascension Catholic Elementary School

5205 New Street
Burlington, Ontario L7L 1V4
and further identified as Project No.: 24137

1.2 CONTRACT DOCUMENTS

- .1 Refer to CCDC 3, GC 1.1 and CCA 1, SCC 1.1.
- .2 The Contract Documents were prepared by the Consultant for the account of the Owner. The material contained herein reflects the Consultant's best judgement in light of the information available to him at the time of preparation. Any use which a third party makes of the Contract Documents, or any reliance on or decisions to be made based on them, are the responsibility of such third parties. The Consultant accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on the Contract Documents.
- .3 These specifications are written in imperative mood in an abbreviated form. The imperative language of the technical sections is directed to the Contractor, unless specifically noted otherwise. Incomplete sentences shall be completed by inserting "shall", "the Contractor shall", and "shall be", and similar mandatory phrases by inference in the same manner as they are applied to notes on the drawings. The words "shall be" will be supplied by inference where a colon (:) is used within sentences and phrases. Except where worded to the contrary, fulfill and perform all indicated requirements whether stated imperatively or otherwise.

1.3 CONTRACT METHOD

- .1 Single Construction Contract: The Contractor shall construct the Work under a CCDC 3, Cost Plus contract.
- .2 Throughout the execution of the Project, the Consultant may bid portions of the Project and nominate Subcontractors, whose parts or portions of the Project will be incorporated as part of this Contract to make up the Work.
- .3 The Consultant will prepare stipulated price CCA 1 Subcontracts for execution between the Contractor and the Subcontractors.
- .4 Refer to the Supplementary Conditions and Supplementary Subcontract Conditions for information pertaining to the contractual relationship between the Contractor and the Subcontractors.

- .5 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.

1.4 ADMINISTRATIVE / PROCEDURAL SECTIONS APPLICABLE TO ALL CONTRACTS AND SUBCONTRACTS

- 01 11 00 Summary of Work
- 01 12 00 Multiple Contract Summary
- 01 22 00 Meetings and Progress Reports
- 01 33 00 Submittal Procedures
- 01 35 30 Health and Safety Requirements
- 01 35 23 Site Safety Protocols for Occupied Buildings
- 01 35 43 Environmental Procedures
- 01 45 23 Testing & Inspection
- 01 45 00 Quality Control
- 01 73 03 Execution Requirements
- 01 74 11 Cleaning
- 01 77 00 Closeout Procedures
- 01 78 00 Closeout Submittals
- 01 78 10 Sample Guarantee/Warranty form

1.5 TEMPORARY UTILITIES, FACILITIES AND SERVICES

- .1 Subcontract SC01: Refer to Section 01 51 00 - Temporary Utilities and 01 52 00 Construction Facilities.
- .2 Each Subcontractor shall Provide and perform the following:
 - .1 Electrical extension cords from distribution sources, work lights and any special power required for Subcontract Work.
 - .2 Separate telephone service required for Subcontract Work.
 - .3 Water hoses required for Subcontract Work.
 - .4 Field offices and sheds required for Subcontract Work.
 - .5 Cleaning of Subcontract Work; delivery of debris to collection.

1.6 CONTRACT No. Project No.: 24137-C00 - CONTRACTOR

- .1 Assume total control of the Works of the Project. Be responsible for coordination, sequencing and scheduling of work of all Contracts, ensure conformity with the Contract Documents.
- .2 Assume sole responsibility for construction means; methods, techniques, sequences and procedures, including site usage; provision of temporary utilities, facilities and services; quality control and coordination of testing and inspection services; and site administration.

- .3 Fulfill the role of the "constructor" as defined in the Ontario Occupational Health and Safety Act (Construction Projects). File the required Notice of Project and carry out and enforce the provisions in the Act and the requirements of the Project Health and Safety Policy.
- .4 Report directly to the Consultant.
- .5 Conduct site management duties for the duration of the Project, including field engineering services necessary to layout the Project and ensure accurate working lines and levels for Subcontract Work. Refer to Section 01 31 00.
- .6 Appoint a single supervisor for the duration of the Contract, until completion of the Contract. Refer to GC 3.6 - Supervisor.
- .7 Arrange for a minimum of one labourer to be present on site each Working Day until completion of the Contract.
- .8 Arrange and pay for the publication of the Project's Certificate of Substantial Performance of the Work.
- .9 Monitor site cleanliness on a daily basis and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans. Provide waste containers on site and arrange for periodic waste removal as necessary until completion of the Contract.

1.7 SUBCONTRACT No. Project No.: 24137-SC01 – GENERAL

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Perform final cleaning of the Project as specified in Section 01 74 00.
- .4 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .5 Include the following Work as part of Subcontract Project No.: **24137-SC01**:
- .6 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions
- .7 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.

- .3 01 51 00 - Temporary Utilities
- .4 01 52 00 - Construction Facilities
- .5 01 56 00 - Temporary Barriers and Enclosures
- .8 Division 02 - Existing Conditions
 - .1 02 10 00 - Existing Site Photos
 - .2 02 41 15 - Selective Demolition & Removal
(including designated substance abatement)
 - .3 02 82 00 - Designated Substance Survey Report
- .9 Division 03 - Concrete
 - No items
- .10 Division 4 - Masonry
 - No items
- .11 Division 05 - Metals
 - .1 05 50 00 - Metal Fabrications
- .12 Division 06 - Wood, Plastics and Composites
 - .1 06 10 11 - Rough Carpentry (not including roofing rough carpentry)
 - .2 06 40 00 - Architectural Woodwork
 - .3 06 47 00 - Plastic Laminates
- .13 Division 07 - Thermal and Moisture Protection
 - .1 07 92 10 - Joint Sealants (not including roofing Joint Sealants)
 - .2 07 41 43 - Aluminum Composite Panels
- .14 Division 08 - Openings
 - .1 08 11 14 - *Steel Doors and Frames* (Separate Price No. 1)
 - .2 08 11 15 - *Door Schedule* (Separate Price No. 1)
 - .3 08 14 10 - *Flush Wood Doors* (Separate Price No. 1)
 - .4 08 80 50 - *Glazing* (Separate Price No. 1 for Glazing in doors - Glazing for windows and curtainwall to be supplied by SC-07)
- .15 Division 09 - Finishes
 - .1 09 84 10 - Acoustic Wall Treatment
 - .2 09 91 22 - Painting
 - .2 09 91 27 - Finishes and Colour Notes (reference)
 - .3 09 91 30 - Room Finish Schedule (reference)
- .16 Division 10 - Specialties
 - .2 10 21 20 - Toilet Partitions
 - .3 10 28 10 - Washroom Accessories
 - .4 10 51 13 - Metal Lockers

1.9 SUBCONTRACT No. Project No.: 24137-SC02 – MECHANICAL

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract Project No.: **24137-SC02**:

- .5 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .6 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
- Division 20 Common Requirements for Mechanical**
- 20 00 01 Mechanical Specification Index
 - Common Contract Requirements for Mechanical
 - 20 02 51 Mechanical Contract Requirements
 - Common Work Results for Mechanical
 - 20 05 11 Mechanical Work Requirements
 - 20 05 21 Demolition and Renovation
 - 20 05 31 Expansion Fittings and Loops
 - 20 05 32 Thermometers and Pressure Gauges
 - 20 05 34 Bases, Hangers and Supports (Indoor)
 - 20 05 49 Vibration Control Measures
 - 20 05 53 Identification of Mechanical Services
 - Testing, Adjusting, and Balancing
 - 20 06 11 Testing, Adjusting, and Balancing (TAB) of Mechanical Systems
 - Commissioning for Mechanical
 - 20 08 11 Mechanical Contractor Commissioning Requirements
- Division 22 Plumbing**
- Division 23 Heating, Ventilating, and Air Conditioning (HVAC)**

1.10 SUBCONTRACT No. Project No.: 24137-SC03 - ELECTRICAL

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract Project No.: **24137-SC03**:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.

- .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
- .3 Division 26 - Electrical
 - .1 26 00 11 Electrical Specification Index
Common Contract Requirements for Electrical
 - .2 26 01 15 Allowances and Fees
 - .3 26 01 16 Electrical General Requirements
 - .4 26 01 17 Demolition and Renovation
Common Work Results for Electrical
 - .5 26 05 19 Wires and Cables
 - .6 26 05 20 Splitters, Junction, and Pull Boxes
 - .7 26 05 21 Outlet Boxes, Conduit Boxes and Fittings
 - .8 26 05 22 Wire and Box Connectors – 0 –1000 V
 - .9 26 05 33 Conduits, Conduit Fastenings and Conduit Fittings
Panelboards
 - .10 26 24 17 Moulded Case Circuit Breakers
Interior Lighting
 - .11 26 51 13 Lighting Equipment
 - .12 26 51 16 Digital Occupancy & Daylight Control Systems

1.19 SUBCONTRACT No. Project No.: 24137-SC04 - DRYWALL AND ACOUSTICS

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract Project No.: **24137-SC04:**
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 09 - Finishes
 - .1 09 21 16 - Gypsum Board Assemblies
 - .2 09 22 16 - Non-Structural Metal Framing
 - .3 09 51 13 - Acoustical Panel Ceilings

1.20 SUBCONTRACT No. Project No.: 24137-SC05 – FLOORING

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract Project No.: **24137-SC05**:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 09 - Finishes
 - .1 09 01 62 – Terrazzo Restoration
 - .2 09 30 13 - Ceramic Tiling
 - .2 09 65 16 - Resilient Sheet Flooring

1.21 SUBCONTRACT No. Project No.: 24137-SC06 - ROOFING

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract Project No.: **24137-SC06**:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 07 – Thermal and Moisture Protection

07 11 00 – 07 92 00 Roofing Specifications by Tri-Tech Pinnacle Group

- .1 07 11 00 – Roofing Scope of Work
- .2 07 14 00 - Roofing Work Restrictions
- .3 07 50 00 – Roofing Temporary Facilities & Controls
- .4 07 51 00 – Roofing Rough Carpentry
- .5 07 52 16 – Styrene-Butadiene-Styrene Modified Bituminous Membrane Roofing
- .6 07 62 00 – Sheet Metal Flashing & Trim
- .7 07 92 00 – Joint Sealers
- .8 Schedule A – List of Plans & Details

1.21 SUBCONTRACT No. Project No.: 24137-SC07 – ALUMINUM WINDOWS & CURTAINWALL

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract Project No.: 24137-SC07:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 08 - Openings
 - .1 08 44 13 - Glazed Aluminum Curtain Wall
 - .2 08 50 50 - Aluminum Windows
 - .3 08 80 50 – Glazing

1.22 SUBCONTRACT No. Project No.: 24137-SC08 - FINISH HARDWARE SUPPLY AND INSTALLATION

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.

- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract Project No.: **24137-SC08**:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 08 - Openings
 - .1 Door Hardware Specifications to be issued and assigned at later date.
- .5 **\$80,000 Allowance.** To be included in CCDC-3 2016.

1.23 SUBCONTRACT No. Project No.: 24137-SC09 - BUILDING CONTROLS

- .1 Report directly to the Contractor on all matters pertaining to the execution of the Work.
- .2 Maintain site cleanliness on a daily basis as it applies to the work of this Subcontract and ensure conformance to the requirements of authorities having jurisdiction with respect to waste audits and waste reduction work plans.
- .3 Sections listed as part of a particular Subcontract package may include work described under other Sections. When referenced as a Related Section, include such portions of the Work as part of that particular Subcontract.
- .4 Include the following Work as part of Subcontract Project No.: 24137-SC09:
 - .1 Division 00
 - .1 00 52 11 - Subcontract Agreement
 - .2 00 71 11 - Subcontracting Definitions
 - .3 00 72 11 - Subcontract Conditions
 - .4 00 73 11 - Supplementary Subcontract Conditions.
 - .2 Division 01 - General Requirements
 - .1 Administrative / procedural sections applicable to all contracts as listed above.
 - .2 Provide and pay for those items listed above in the temporary utilities, facilities and services as required for the Subcontract Work.
 - .3 Division 25 - Integrated Automation
 - .1 25 20 11 Building Automation System
- .5 **\$124,578 Allowance** (provided previously by Johnson Controls – see enclosed).
To be included in CCDC-3 2016.

1.24 CONTRACTOR ACCESS TO AND USE OF THE PLACE OF THE WORK

- .1 Upon written request to the Owner, and prior to commencing the Work at the Place of the Work, the Contractor may visit the existing facility for the purpose of observing existing conditions and taking field measurements. Such visits may only occur on weekdays after 3:30 pm.
- .2 The Contractor will be granted access to the Place of the Work for the purpose of commencing the Work on or after **July 2, 2025**.
- .3 Contractor shall limit use of the existing facility, including the Place of the Work, for the execution of the Work, for storage, and for access, to allow:
 - .1 Owner occupancy,
 - .2 Work by other contractors, and
 - .3 Public usage.

1.25 OWNER OCCUPANCY OF THE EXISTING FACILITY

- .1 Owner will occupy the existing facility during the entire construction period for execution of normal operations.
- .2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.26 PHASING OF THE WORK

- .1 Construct the Work in phases to accommodate the Owner's continued use of the existing facility during construction.
- .2 Refer to the phasing schedule indicated on the Drawings.

1.27 PARTIAL OWNER OCCUPANCY OF THE WORK

- .1 Owner may temporarily occupy designated areas of the Work for the purpose of storing furnishings and equipment and installing equipment.
- .2 In accordance with GC 5.10 - Non-Conforming Work, partial Owner occupancy will not be considered as an acceptance of the Work, nor in any way relieve the Contractor of his responsibility to complete the Work.

1.28 SUBSTANTIAL PERFORMANCE OF THE WORK

- .1 Refer to GC 5.5 - Substantial Performance of the Work.
- .2 Substantial Performance of the Work is required on or before September 1, 2025.

END OF SECTION

Part 1 General

1.1 PROJECT MEETINGS FOR COORDINATION

- .1 In consultation with the Consultant not later than the second week of construction, arrange for site meetings weekly or every 2 weeks as appropriate to the stage of construction, for project coordination. Such meetings shall fall at the same time each week the meeting is scheduled.
- .2 Responsible representatives of the Contractor's and Subcontractor's office and field forces and suppliers shall be obliged to attend.
- .3 Inform the Owner, Consultant, and those others whose attendance is obligatory, of the date of each meeting, in sufficient time to ensure their attendance.
- .4 Provide physical space for meetings, prepare an agenda, chair and record the minutes of each meeting. Relevant information must be made available to all concerned, in order that problems to be discussed may be expeditiously resolved. Identify "action by: _____".
- .5 Within three days after each meeting, distribute two copies of the minutes to each invited person and regular distribution list to be issued by the consultant.

1.2 PRECONSTRUCTION MEETING

- .1 Within 5 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Include in the agenda the following:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Site Safety and Security
 - .3 Scheduling of Work. Schedule to include a detailed breakdown of mechanical and electrical works.
 - .4 Interference with ongoing business.
 - .5 Work by other Contractors.
 - .6 Schedule of submission of shop drawings and samples.
 - .7 Requirements for temporary facilities, site sign, offices, storage sheds utilities.
 - .8 Delivery schedule of specified equipment and identification of long-lead or other critical items.
 - .9 Site security.
 - .10 Procedures for Contemplated change notices, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
 - .11 Record drawings.
 - .12 Maintenance manuals.
 - .13 Take-over procedures, acceptance, warranties.
 - .14 Monthly progress claims, administrative procedures, photographs, holdbacks.

- .15 Appointments of inspection and testing agencies or firms.
- .16 Insurances, transcript of policies.
- .17 Schedule for progress meetings.

1.3 PROJECT MEETINGS FOR PROGRESS OF WORK

- .1 Conduct progress meetings in accordance with the schedule and/or decisions made at Preconstruction meeting.
- .2 Inform the Owner, Consultant, project consultants, Subcontractors and suppliers and those whose attendance is obligatory, of the date of the meeting, in sufficient time to ensure their attendance.
- .3 Include in the agenda the following:
 - .1 Site Safety and security record or incidents.
 - .2 Review, approval of minutes of previous meeting.
 - .3 Review of Work progress since previous meeting.
 - .4 Field observations, problems, conflicts.
 - .5 Problems which impede construction schedule.
 - .6 Review of off-site fabrication delivery schedules.
 - .7 Corrective measures and procedures to regain projected schedule.
 - .8 Revisions to construction schedule.
 - .9 Progress during succeeding work period as a “two-week look ahead”.
 - .10 Review submittal schedules: expedite as required.
 - .11 Maintenance of quality standards.
 - .12 Pending changes and substitutions.
 - .13 Review proposed changes for effect on construction schedule and on completion date.
 - .14 Other business.

1.4 PROGRESS RECORDS

- .1 Maintain a permanent written record on the site of the progress of the work using standard OGCA form. This record shall be available to the Consultant at the site, and a copy shall be furnished to same on request. The record shall contain:
 - .1 Daily weather conditions, including maximum and minimum temperatures.
 - .2 Dates of the commencement and completion of stage or portion of the work of each trade in each area of the project.
 - .3 Conditions encountered during excavation.
 - .4 Dates of erection and removal of formwork, in each area of the project.
 - .5 Dates of pouring the concrete in each area of the project, with quantity and Particulars of the concrete.
 - .6 Work force on project daily per trade and active hours.
 - .7 Visits to site by personnel of Consultant, Jurisdictional Authorities and testing companies.

1.5 PROGRESS REPORTS

- .1 Submit to the Consultant, Monthly Progress Reports consisting of a concise narrative and a marked-up summary schedule showing physical percentage complete by item and in total. These progress calculations must agree with the Progress Payment Claims. masonry; mechanical, finishing trades and the like. Include with this submission the digital schedule referenced below

1.6 DIGITAL PROJECT SCHEDULES

- .1 At the outset of the project, General Contractor to provide and maintain a digital project schedule including Milestone Dates and listing all trades.
- .2 Update and issue to Consultant in hard copy and electronic copy not less than monthly and at each Progress Draw. To be issued in format compatible with Microsoft Project program.
- .3 At 70% completion, or 16 weeks prior to Substantial Completion, whichever comes first, Project develop a detailed Completion Schedule outlining final coordination and sequences to completion.

1.7 DOCUMENTS REQUIRED AT PROJECT START, DURING CONSTRUCTION AND CLOSE OUT

- .1 Refer to Section 01 11 00 – Summary of Work, article 1.46.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 PRODUCT SUBSTITUTION PROCEDURES

- .1 Requests for substitution will only be considered when submitted in sufficient time to permit proper evaluation by the Consultant.
- .2 When requesting Consultant review of a proposed Product substitution, demonstrate that the proposed substitute will perform equally as well or better as the specified Product.
- .3 Accompany each request for substitution with a list of properties for both the specified Product and the proposed substitute, including the following information:
 - .1 Product identification, including manufacturer's name, address, telephone and fax numbers, and web site address where available.
 - .2 Manufacturer's Product data sheets, including material descriptions, compliance with applicable reference standards, and performance and test data.
 - .3 A summarized comparison of physical properties and performance characteristics for the specified Product and the proposed substitution, and clearly highlighting significant variations.
 - .4 Indication of availability of maintenance services and sources of replacement materials and parts, including associated costs and time frames.
 - .5 Indication of cost savings and reduction of construction schedule.
 - .6 Verification that the substitute will not result in additional costs or a reduction in performance to other portions of the Work.
 - .7 Reason for requesting the substitution.
- .4 The clauses "or equal", "or approved equal", or other similar clauses, will not be construed as an invitation to submit requests for substitution or to unilaterally substitute Products in place of the specified Products and systems.
- .5 The abbreviation "eg." means "for example", and a Product listed thereafter is named as an example of the Product upon which the specification is based. Similar Products from other Acceptable Manufacturers are acceptable for use, provided they meet the specified criteria.
- .6 Failure to order specified Products in adequate time to meet the approved construction schedule will not be a valid reason to submit a request for substitution. In accordance with GC 6.5 - Delays, such delays remain the responsibility of the Contractor, and will not result in an extension to the Contract Time or be subject to reimbursement by the Owner.
- .7 The Owner is under no obligation to consider Product or system substitutions recommended by the Contractor.

- .8 Remove and replace substitutions incorporated into the Work without the Consultant's written approval.

END OF SECTION

Part 1 General

1.1 CLARIFICATIONS

- .1 Request written clarifications when the meaning of the Contract Documents is unclear.
- .2 Do not proceed with related parts of the Work until clarification is received.
- .3 Failure to notify Consultant when the Contract Documents are unclear or inconsistent will result in the Contractor incurring responsibility for resulting deficiencies and additional costs.
- .4 Clarifications issued by the Consultant are deemed to supercede the relevant parts of the Contract Documents, regardless whether those documents are cited in the written clarification.

1.2 REQUESTS FOR INTERPRETATION

- .1 The Contractor may, after exercising due diligence to locate the required information, request from the Consultant clarification or interpretation of the Contract Documents, hereinafter referred to as a request for interpretation (RFI).
- .2 Submit RFI on a form acceptable in content to the Consultant, including a detailed description of the Contractor's review of the Contract Documents leading up to the issuance of the RFI. Requests for interpretation that fail to include a detailed review description, or whose description is insufficient in the opinion of the Consultant, may not be considered and may be rejected.
- .3 Maintain a log of RFI sent to and responses received from the Consultant, complete with corresponding dates. Submit updated RFI log with each application for payment.
- .4 Submit RFI to Consultant sufficiently in advance of affected parts of the Work so as not to cause delay in the Work. Additional costs incurred as a result of failure to submit an RFI in sufficient time will not be reimbursed by Owner.
- .5 Submit one RFI per RFI form, numbered consecutively in a single sequence, in the order submitted.
- .6 The Consultant will review and respond to RFI with reasonable promptness.
- .7 The Consultant's response to RFI will not be considered a Changer Order or Change Directive, nor does it authorize changes in the Work, the Contract Price and the Contract Time.
- .8 If, at any time, the Contractor submits a large quantity of RFI, such that the Consultant cannot process them within a reasonable period of time, then the Consultant will notify the Contractor of such in writing. In this event, the Contractor and the Consultant will jointly prepare an estimate of time necessary for processing the RFI, as well as determining an order of priority among the submitted RFI. The Contractor will accommodate such necessary time at no increase in the Contract Time and Contract Price.
- .9 If the information requested in an RFI is apparent from field observations, is contained in the Contract Documents or is reasonably inferable from them, the Contractor shall be responsible to the Owner for reasonable costs charged by the Consultant for additional services required to prepare and issue such information.
- .10 A request for interpretation (RFI) will not constitute a notice of claim for a delay.

1.3 CONTRACT MODIFICATION PROCEDURES

- .1 Refer to GC 6.1 - Owner's Right to Make Changes, GC 6.2 - Change Order and GC 6.3 - Change Directive.

- .2 Once a Proposed Change has been issued by the Consultant, it shall be the responsibility of the Contractor to ensure that no work is carried out that may increase the cost of the variation contemplated.
- .3 The Consultant will assess the fair market cost of each change before issuing a Change Order. Assist the Consultant with this task by quoting variations in a complete manner, listing:
 - .1 quantity of each material,
 - .2 unit cost of each material,
 - .3 man hours involved,
 - .4 cost per hour, and
 - .5 Subcontractor quotations.
- .4 The Consultant may require further quotations in order to show a breakdown of costs.
- .5 The Owner and the Consultant will not be responsible for delays to the Work resulting from late, incomplete or inadequately broken down valuations submitted by the Contractor.
- .6 Minor variations may be made in the project from time to time as approved by the Consultant. Such alterations or adjustments shall not constitute a change in cost unless a request is made at the time. No extra will be contemplated except where a clear indication is made that extra payment is claimed, in which case a Proposed Change or Change Directive will be issued by the Consultant in accordance with GC 6.1 - Owner's Right to Make Changes, or GC 6.3 - Change Directive. Unless this procedure is followed, no claims for extras will be allowed.

END OF SECTION

1 General

1.1 COORDINATION

- .1 Coordinate the Work to ensure the Work proceeds safely and expeditiously.
- .2 Ensure adequate communication among involved parties.
- .3 Allocate mobilization areas of the Place of the Work; for field offices and sheds, for access, traffic, and parking facilities.
- .4 Coordinate use of the Place of the Work and facilities through procedures for submittals, reports and records, schedules, coordination of Drawings, recommendations, and resolution of ambiguities and conflicts.
- .5 Submit information required for preparation of coordination and interference drawings. Review and approve revised drawings for submission to Consultant.

1.2 DOCUMENTS AT THE PLACE OF THE WORK

- .1 Maintain an up-to-date copy of the following documents at the Place of the Work:
 - .1 The Contract Documents, including the Drawings, Specifications, addenda, bid revisions, Notices in Writing, Supplemental Instructions, proposed changes, Change Orders, Change Directives, and other modifications to the Contract.
 - .2 Accepted Shop Drawings, Product data and samples.
 - .3 Quality control submittals, including test and evaluation reports.
 - .4 Manufacturer's instructions, including installation and maintenance guidelines.
 - .5 Construction schedule.
 - .6 Additional requested schedules.
 - .7 Consultant's field review reports and deficiency reports.
 - .8 Reports from authorities having jurisdiction.
 - .9 Permits.
 - .10 Construction daily log.
 - .11 Record as-built documents as described in Section 01 78 00.
- .2 Make documents available to Consultant for review at the Place of the Work.
- .3 Construction Daily Log: Maintain a construction log, recording on a daily basis the following information:
 - .1 Number of workers actively working at the Place of the Work, organized on a Trade Contract basis.
 - .2 Subcontractors working at the Place of the Work.
 - .3 Identify the parts of the Work being worked on.
 - .4 Identify the working hours being kept at the Place of the Work.
 - .5 Activities with intermittent progress.
 - .6 Time lost with an explanation as to cause.
 - .7 Difficulties encountered, such as construction activity delays, labour inefficiencies, labour shortages, etc.
 - .8 Product deliveries.
 - .9 Equipment mobilization and de-mobilization.

- .10 Demolition conditions.
- .11 Start and finish dates for each part of the Work.

1.3 OTHER CONTRACTORS

- .1 Cooperate with any separate contractor employed by the Owner and, if necessary, co-ordinate with their work.
- .2 Submit necessary information to Owner to assist in the required scheduling of such contractors.

1.4 CONTINUANCE OF OWNER OPERATIONS

- .1 Coordinate and schedule the Work to minimize any disruption of the normal functions of the existing building.
- .2 Changes to the traditional scheduling of construction may be required and certain portions of the Work may not be able to proceed in continuous sequence.
- .3 Every reasonable effort will be made to cooperate with the construction process.
- .4 The Owner may modify proposed scheduling where such changes are in the best interests regarding the operation of the existing building.

1.5 GENERAL REQUIREMENTS FOR PROJECT MEETINGS

- .1 Schedule and administer project meetings in consultation with Consultant, throughout the progress of the Work.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting 4 days in advance of meeting date to Consultant and Owner.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the minutes. Include significant proceedings and decisions. Identify action by the parties.
- .7 Reproduce and distribute copies of minutes within 5 days after meeting and transmit to meeting participants, affected parties not in attendance, the Consultant, and the Owner.
- .8 Representative of Contractor, Subcontractor, and suppliers attending meetings shall be qualified and authorized to act on behalf of the party each represents.
- .9 Schedule meetings at regular 14 day intervals, on a day that is determined as convenient by Contractor and Consultant.

1.6 PRE-CONSTRUCTION MEETING

- .1 Within 15 days after award of Contract, request a meeting with the Owner to discuss and resolve administrative procedures and responsibilities.
- .2 Conduct meetings with Subcontractors and Suppliers to discuss and resolve administrative procedures and responsibilities.
- .3 Owner, Consultant, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .4 Establish time and location of meeting and notify parties concerned a minimum of 5 days before meeting date.
- .5 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .6 Pre-construction Meeting Agenda: include the following:
 - .1 Appointment of official representative of participants in the Work;
 - .2 Schedule of Work, progress scheduling;
 - .3 Schedule of submissions of shop drawings, samples, colour chips;
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences;
 - .5 Delivery schedule of specified equipment;
 - .6 Site security;
 - .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements;
 - .8 Owner provided products;
 - .9 Record drawings;
 - .10 Maintenance manuals;
 - .11 Take-over procedures, acceptance, warranties;
 - .12 Monthly progress claims, administrative procedures, photographs, holdbacks;
 - .13 Appointment of inspection and testing agencies or firms;
 - .14 Insurances, transcripts of policies.

1.7 PREINSTALLATION MEETINGS

- .1 During the course of the Work, schedule preinstallation meetings as required by the Contract Documents.
- .2 Wherever possible, schedule preinstallation meetings on the same date as regularly scheduled progress meetings.
- .3 The Contractor, affected Subcontractors and Suppliers, manufacturer's representatives, field inspectors and supervisors, the Consultant and any other specified parties are to be in attendance.
- .4 Preinstallation Meeting Agenda: include the following:
 - .1 Review of existing conditions and affected parts of the Work, and any testing thereof;

- .2 Review of installation procedures and requirements;
- .3 Review of environmental and field condition requirements;
- .4 Schedule of the applicable parts of the Work;
- .5 Schedule of submission for samples and other items requiring Consultant's selection;
- .6 Requirements for Temporary Work;
- .7 Requirements for notification for reviews. Allow a minimum of 48 hours notice for Consultant to review the affected parts of the Work;
- .8 Requirements for inspections and tests as applicable. Schedule and undertake inspections and tests;
- .9 Delivery schedule for Products; and
- .10 Special safety requirements and procedures.

1.8 PROGRESS AND PROGRESS DRAW MEETINGS

- .1 During course of the Work and 2 weeks prior to completion of the Contract, schedule progress meetings biweekly.
- .2 During course of the Work, schedule progress draw meetings monthly.
- .3 Submit to Consultant a copy of the application for payment not less than two Working Days before scheduled progress draw meeting. Consultant may require changes to the application for payment prior to progress draw meeting.
- .4 Contractor, major Subcontractors involved in Work, Consultant, and Owner are to be in attendance.
- .5 Progress Meeting Agenda: include the following:
 - .1 Review, approval of minutes of previous meeting;
 - .2 Review of Work progress since previous meeting;
 - .3 Field observations, problems, conflicts;
 - .4 Problems impeding construction schedule;
 - .5 Review of off-site fabrication delivery schedules;
 - .6 Corrective measuring and procedures to regain project schedule;
 - .7 Revision of construction schedule;
 - .8 Progress, schedule, during succeeding work period;
 - .9 Review submittal schedules, record drawings: expedite as required;
 - .10 Maintenance of quality standards;
 - .11 Review of proposed changes for affect on construction schedule and on completion date;
 - .12 Other business.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Shop drawings and product data.
- .2 Samples and mock ups.

1.2 SHOP DRAWINGS

- .1 Submit to Architect, for review, shop drawings, product data and samples specified.
- .2 Until submission is reviewed, work involving relevant product must not proceed.

1.3 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Drawings to be originals prepared by Contractor, Subcontractor, Supplier or Distributor, which illustrate appropriate portion of work; showing fabrication, layout, setting or erection details as specified in appropriate Sections.
- .3 Identify details by reference to sheet and detail numbers shown on Contract Drawings.
- .4 Maximum sheet size 606 x 909 mm.
- .5 Reproductions for submissions: opaque diazo prints.

1.4 PROJECT DATA

- .1 Certain specification Sections specify that manufacturer's standard schematic drawings, catalogue sheets, diagrams schedules, performance charts, illustrations and other standard descriptive data will be accepted in lieu of shop drawings.
- .2 Above will only be accepted if they conform to following:
 - .1 Delete information which is not applicable to project.
 - .2 Supplement standard information to provide additional information applicable to project.
 - .3 Show dimensions and clearances required.
 - .4 Show performance characteristics and capacities.
 - .5 Show wiring diagrams (when requested) and controls.

1.5 COORDINATION OF SUBMISSIONS

- .1 Review shop drawings, product data and samples prior to submission.
- .2 Verify:

- .1 Field measurements.
- .2 Field construction criteria.
- .3 Catalogue numbers and similar data.
- 3 Co-ordinate each submission with requirement of work and Contract documents. Individual shop drawings will not be reviewed until all related drawings are available.
- 4 Contractor's responsibility for errors and omissions in submission is not relieved by Architect's review of submittals.
- 5 Contractor's responsibility for deviations in submission from requirements of Contract documents is not relieved by Architect's review of submission, unless Architect gives written acceptance of specified deviations.
- 6 Notify Architect, in writing at time of submission, of deviations from requirements of Contract documents.
- 7 After Architect's review, distribute copies.

1.6 SUBMISSION REQUIREMENTS

- 1 Schedule submissions at least fourteen (14) days before dates that reviewed submissions will be required to be returned.
- 2 Submit one reproducible transparency, plus six (6) opaque diazo copies of shop drawings, product data to Architect for review.
- 3 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Number of each shop drawing, product data and sample submitted.
 - .5 Other pertinent data.
- 4 Submissions must include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name of:
 - .1 Contractor.
 - .2 Subcontractor.
 - .3 Supplier.
 - .4 Manufacturer.
 - .5 Separate detailer when pertinent.
- 5 Identification of product or material:
 - .1 Relation to adjacent structure or materials.
 - .2 Field dimensions, clearly identified as such.

- .3 Specification Section number.
- .4 Applicable standards, such as CSA or CGSB numbers.
- .5 Contractor's stamp, initialed or signed, certifying review of submission, verification of field measurements and compliance with Contract documents

1.7 INTERFERENCE DRAWINGS

- .1 Prepare interference drawings for all work in confined space: all typical ceiling space conditions and atypical conditions. Coordinate with all trades.
- .2 Submit as shop drawings in advance of fabrication or installation of components. Site conditions requiring corrections, due to failure to provide interference drawings as required will be corrected at no additional cost to the owner.
- .3 Ceiling heights and bulkheads will not be revised during construction due to failure to prepare interference drawings.

1.8 SHORING DESIGN DRAWINGS

- .1 If required as part of this project, or due to construction sequence, it is the contractor's responsibility to provide in advance of any work requiring shoring, detailed Shoring design drawings bearing the seal of a Professional engineer registered in the Province of Ontario and also a Method Statement describing the work sequence.
- .2 Submit to the Consultants as shop drawings in advance of the work.

1.9 SHOP DRAWINGS BEARING THE SEAL OF A PROFESSIONAL ENGINEERS

- .1 In addition to any the similar requirements for shop drawings of any mechanical or electrical systems, Shop Drawings for all structural components or components required to perform in conjunction with other structural or building envelope components, cladding and the like shall bear the seal of a professional engineer licensed in the Province of Ontario.
- .2 In addition, all components to be attached to or suspended from the walls and ceiling areas shall also bear the seal of a professional engineer licensed in the Province of Ontario. This shall include but not be limited to the following:
 - .1 Stage drapery and rigging
 - .2 Stage lighting system
 - .3 Gymnasium equipment such as basketball backstops
 - .4 Projection screen supports

1.10 LIST OF SAMPLE OR MOCK-UP SUBMITALS

- .1 At the outset of the project the contractor shall prepare a comprehensive list of all shop drawings, sample submissions and mock ups required.
- .2 For assistance only, the following samples and mock up items to be provided are included but not limited to the list following (note this is not exclusive of data sheets and shop drawings):
 - .1 04 21 13 Brick Masonry samples, mock-up (2m x 2m)

.2	04 21 13	Masonry Accessories	samples
.3	04 22 00	Concrete Masonry	samples
.4	06 40 00	Architectural Woodwork	samples (300mm x 300mm)
.5	06 47 00	Plastic Laminates	samples
.6	07 21 13	Board Insulation	samples
.7	07 27 10	Air Barriers	samples
.8	07 41 43	Aluminum Composite Panels	samples, mock-up (3m x 2m)
.9	07 92 10	Joint Sealing	samples and mock up
.10	08 71 10	Finish Hardware	samples
.11	09 30 13	Ceramic Tiling	samples
.12	09 51 13	Acoustical Panel Ceilings	samples (300 x 300)
.13	09 65 19	Resilient Tile Flooring	samples
.14	09 91 22	Painting	draw downs, mock-up
.15	10 11 25	Manufactured Specialties	samples
.16	10 21 20	Laminated Plastic Toilet Partitions	colour samples

1.11 SUBMISSIONS TO INSPECTION AGENCIES

- .1 Note that Paint formulations specified are to be submitted to the OPCA or MPI with set up documentation upon award of Contract.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 This Section outlines the mandatory minimum Health and Safety protocols for all renovation, addition and new school construction Projects where all or a portion of the existing school building remains occupied and in use.
- .2 These Health and Safety protocols are mandatory minimum requirements, procedures and standards that the School Board insists are fully complied with by all parties involved with renovation projects.

1.2 RELATED SECTIONS

- .1 These specifications apply to all Divisions of this Project specification. It is the responsibility of the Contractor to apply these provisions wherever practical within specification limits to all products and services used on this Project.
- .2 The requirements of this Section supersede those of all other specification Sections and Drawings. Where conflicts exist in procedures, methods or materials, they shall immediately be brought to the attention of the Consultant and Board Project Manager. Where clarification is not immediately available, the Contractor shall assume the specifications contained in this Section are a minimum standard and the more stringent specification shall apply.
- .3 The Contractor must receive approval from Board Project Manager for any deviations from this specification Section.
- .4 The General Contractor shall recognize that it is *he* who is the Constructor of the Project. The General Contractor shall also recognize that he is solely responsible for site safety at the Place of the Work and compliance with the requirements of this Section does not limit or remove his total responsibility for site safety as Constructor of the Project.

1.3 REFERENCES

- .1 Applicable related regulations, standards and laws related to safety include but are not limited to:
 - .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
 - .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
 - .3 Province of Ontario
 1. Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. 1990 June 2002.

1.4 COMPLIANCE SPECIFICATION

- .1 Notwithstanding the requirements of this Section, the Contractor must comply with all applicable health, safety and environmental regulations and statutes.

1.5 BEYOND COMPLIANCE SPECIFICATION

- .1 These specifications apply in addition to all applicable health, safety and environmental compliance regulations. They are incorporated here to reflect the Board's intention to develop a specification which provides the safest practical procedures and policies for construction project sites that are occupied and in use by staff, students and visitors during the execution of the Construction Contract.
- .2 Beyond compliance specifications recognize that performance well beyond the minimum regulatory standard is often desirable, possible and affordable, often with no cost or low cost options. It also recognizes that application methods or protocols may be as important as the material specified. Therefore, these specifications cover both material and methods.
- .3 These provisions apply to both indoor and outdoor applications equally.

Part 2 Products

2.1 NOT USED

Part 3 Execution and Compliance Requirements

3.1 APPLICATION OF COMPLIANCE REQUIREMENTS

- .1 The articles set out herein are to be applied together as a set of related policies and procedures to achieve a comprehensive Health and Safety working protocol.
- .2 The Contractor shall execute all of the procedures and meet all of the requirements set out herein and apply these protocols from the outset of the Construction Phase.
- .3 These procedures or requirements are to be maintained for the duration of the Construction Phase. The Contractor shall not discontinue any of the individual procedures or requirements without the prior approval of the Board Project Manager.

3.2 SITE SUPERVISOR (SITE SUPERINTENDENT)

- .1 A full-time Site Supervisor (Site Superintendent) is required on site, regardless of the number of active workers on site.
- .2 Site Superintendent shall have as a minimum:
 - .1 Recent, previous experience with renovation or addition projects involving occupied buildings including (but not limited to) school construction, sites with students, tenants, employees, retail customers, pedestrian and vehicular traffic.

- .2 Successful completion of a multi-session Supervisor's training course conducted by a recognised Construction Association in Ontario.
- .3 Site Superintendent must carry a cell phone at all times during construction with the ability to be reached directly during all work hours and the ability to have voicemail recorded and accessed during all non-work hours including weekends and holidays.
- .4 Site Superintendent must have means of live phone or walkie-talkie communication with the site Flagman during all work hours.
- .5 Site Superintendent shall not be changed throughout project unless confirmed and approved by the Board Project Manager.

3.3 ONTARIO OCCUPATIONAL HEALTH & SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS

- .1 General Contractor to comply with the Ontario Occupational Health & Safety Act and Regulations for Construction Projects, latest edition– including all amendments.
- .2 Beyond compliance in item .1 above, regardless of the number of labourers active on the Project, the General Contractor shall form a contractors' Health & Safety Committee at the outset of construction. This Committee shall then follow the standard requirements for such a Committee as set out in the *Occupational Health & Safety Act and Regulations for Construction Projects*.

3.4 ON-SITE COMMUNICATIONS

- .1 At the outset of the project the General Contractor shall provide to the Board Project Manager all relevant contact information for the Site Superintendent, GC Project Manager and key sub-contractors including names and cell phone numbers.
- .2 The General Contractor shall provide at least one "emergency contact" telephone number at which the Contractor's representative can be reached directly during all work hours and have the ability to have voicemail recorded during all non-work hours including weekends and holidays. As outlined below, this may be designated to the Site Superintendent's cell phone number.
- .3 Regardless of compliance method for the emergency contact telephone number stated above, the Site Superintendent must carry a cell phone at all times during construction with the ability to be reached directly during all work hours and the ability to have voicemail recorded during all non-work hours including weekends and holidays.
- .4 Site Superintendent must have means of live phone or walkie-talkie communication with the site Flagman during all work hours.
- .5 The Contractor is to ensure that the Board Project Manager is immediately apprised of any safety issues as each arises and the related request and/or resolution. The Board Project Manager is responsible for any decisions that have an effect on the contract execution.

- .6 Notwithstanding the reporting to the Project Manager noted above the Site Superintendent shall liaise with school principal or designate on all safety related matters as required on a daily basis.
- .7 In the event of a safety issue requiring contractual clarification or action (i.e. Change Notice, etc.), the contractor shall ensure that, where applicable, the action is followed up with appropriate documentation.

3.5 FULL-TIME ON-SITE FLAGMEN

- .1 A full-time, designated Flagman is required at all vehicular construction entrances. Refer to drawings for the scope and locations.
- .2 In the event there is more than one entrance to the hoarded/fenced construction area, there must be a separate Flagman for each entrance.
- .3 Flagman may not be same person as Site Superintendent or other construction worker.
- .4 Flagman shall not be changed throughout the Project unless confirmed and approved by the Board Project Manager.
- .5 Flagman must have means of phone communication with Site Superintendent (phone or walkie-talkie).
- .6 The Flagman shall not be designated for any other duties than to act as a Flagman for safety purposes as described herein.
- .7 The Flagman shall meet and escort any construction traffic from the site **entrance** into and out of the hoarded/fenced construction area (including through open site areas until entrances to hoarding).
- .8 The Flagman shall only open hoarded areas when construction traffic moves through and immediately re-close gates.
- .9 The Flagman shall control construction parking at the school site (including vehicles parking or traveling in unauthorized areas).
- .10 The location of the Flagman shall be set to ensure the safe guarding of staff, student, and pedestrian traffic.
- .11 If not designated on the Contract Documents, the location of the Flagman shall be confirmed with the Board Project Manager and Consultant at the outset of the project and before the placement of hoarding and fencing.
- .12 Where the Contractor deems it necessary, in order for the Flagman to carry out the required full-time duties, the cost of a temporary shelter shall be included in the Tender Price.

- .13 The Flagman shall be properly attired to carry out his duties, including the use of safety equipment (e.g. wear reflective vest, have appropriate traffic hand-held “Stop” sign and have a visible identification tag).

3.6 SITE SAFETY SIGNAGE

- .1 Standardised Safety Signage is required at all construction entrances.
- .2 If not designated on the Contract Documents, the location of the Safety Signage shall be confirmed with the Board Project Manager and Consultant at the outset of the Project and before the placement of hoarding and fencing.
- .3 Safety Signage is to be posted at all street entrances to school site and at each entrance to hoarded/fenced construction area.
- .4 Total surface area of signage is to avoid exceeding municipal standards that would require a separate signage permit.
- .5 Access signage text shall include cell phone contact number for Site Superintendent.
- .6 Signage posted at gates shall state restrictions on hours of entry and egress as described in the Contract Documents and under no circumstances shall construction traffic be allowed within 30 minutes prior to school start, during recess, lunch break, and 30 minutes after dismissal periods.

3.7 ACCESS/EGRESS CONTROLS

- .1 At the outset of the Contract, the General Contractor shall advise all suppliers and subcontractors of the protocols listed herein and of the requirement to contact the Site Superintendent by Cell phone prior to entering the site.
- .2 The drivers of all construction vehicles entering the site, including delivery vehicle drivers, are to contact site Superintendent by cell phone prior to entering site; the Site Superintendent shall, in turn, give notice to the Flagman to be aware of the traffic and authorize the Flagman to allow entry of that vehicle.
- .3 Vehicular Gates are only for entry and exit of for construction purposes such as construction personnel, Authorities performing inspections, Board representative, delivery personnel, and disposal pickup and ONLY under escort by the Flagman. As such vehicular gates must remain closed and locked at all times and only opened for access/egress under escort by the Flagman, then closed and locked again.
- .4 Gates are to be lockable swing gates for vehicles and man gates at all access points to the hoarded/fenced construction area.

3.8 CONTRACTOR PARKING

- .1 Contractor parking shall be restricted to hoarded areas or designated parking areas only where pre-approved by Board Project Manager and Principal.
- .2 Contractor parking is restricted from all off-site street areas that interfere with site specific parent drop-off and parking areas.

3.9 REQUIRED PRE-CONSTRUCTION MEETINGS

- .1 Meeting 1: Contractor shall receive approval from the Architect and the Board Project Manager for parking, vehicular movement, access/egress strategies at a Pre-construction meeting taking place in advance of mobilizing on site.
- .2 Meeting 2: Once hoarding and fencing is erected BEFORE site construction is fully active and vehicles or equipment is mobilized on site, an initial site meeting shall take place at which time the layout of trailers and staging, deliveries, storage of materials, parking areas and vehicular movement to be reviewed and approved by the Board Project Manager.
- .3 See article 3.12- '*Site Meetings*' following.

3.10 CONSTRUCTION FENCING AND HOARDING

- .1 Construction hoarding requirements shall be a site based decision to be determined by the Architect and the Board Project Manager at the design stage and shown on Contract Documents.
- .2 No fencing or hoarding shall be less than a continuous 1800 mm high.
- .3 In portions of the site where chain link is approved, it shall be continuous 1800 mm high chain link fencing, wire-tied to staked iron 'tees' at 1800 mm on centre - OR - leased, modular 'quick fencing' if staked down and wire tied together.
- .4 All fenced and hoarded areas to be gated with lockable vehicular and man gates-minimum construction to be steel rail and chain link construction.
- .5 Plastic snow fencing is NOT permitted.
- .6 All hoarding and fencing shall be maintained in a stable condition, for duration of construction period as part of the base contract price and to include Superintendent's inspection at the beginning and end of each work day.
- .7 All Fire Routes to be outside all fenced and hoarded areas and maintained clear at all times.
- .8 'Covered way' protection shall be provided when accesses or pathways are in proximity to construction, in accordance with Ministry of Labour *Occupational Health & Safety Act* Regulations.

3.11 HEALTH, WELLNESS & SAFETY DEPARTMENT REPRESENTATIVE

- .1 A representative of the Board's Health, Wellness & Safety Dept. ('Environment, Health and Safety Officer') may visit site at any anytime throughout the duration of the Contract to review the site, as it relates to the safety of the occupied areas of the site. Such site review shall neither constitute an inspection or approval for the Contractor.
- .2 Concerns or issues identified by the representative from the Board's Health, Wellness & Safety Dept. shall be communicated through the Board Project Manager and the school Principal for corrective action.
- .3 Contractor shall ensure full access to all site areas, at all times, for the Board's Health, Wellness & Safety Department Representative.

3.12 SITE MEETINGS

- .1 Coordinate the requirements of this Section with *Section 01 22 00 – 'Meetings and Progress Reports'*.
- .2 Initial site meeting to take place after erecting fencing and hoarding but prior to the mobilisation of any vehicles, equipment or start of Work.
- .3 Contractor shall ensure that the Board Project Manager, School Principal and a representative of the Board's Health, Wellness & Safety Department and the School Principal attend the initial site meeting.
- .4 The initial meeting shall review and approve a standardised agenda for all site meetings and a thorough review of the Site Safety Protocol.
- .5 The standardised agenda shall include a Checklist and Report of Health and Safety items at the beginning of the agenda. This Checklist shall be included and each item reviewed at all site meetings for the duration of the project.
- .6 The Checklist of Site Safety items shall include but not be limited to:
 - .1 Contractor's report of site safety record and report of recent site activities, precautions or actions.
 - .2 Review any visits to the site and actions required by Ministry of Labour or Board Health, Wellness & Safety representatives or other Authorities Having Jurisdiction.
 - .3 Contractor's Health & Safety policy manual posted in site trailer.
 - .4 Copy of Ministry of Labour *Occupational Health & Safety Act and Regulations for Construction Projects* in site trailer.
 - .5 Name of General Contractor H&S representative.
 - .6 Continuing compliance with Safety Signage.
 - .7 Hoarding & fencing layout and condition.
 - .8 Access and egress measures and any breaches of requirements.
 - .9 Confirmation of communications link between Site Superintendent & Flagman.

- .10 Work that may produce any noxious odours and the containment measures, (*i.e.*: schedule, type, approvals required therefore).
- .11 Copies of Material Safety Data sheets in site trailer.
- .12 Complete meeting minutes including details of Safety Checklist shall be copied to Architect, Board Project Manager and Principal.
- .7 Contractor to produce record of written Memorandum to all subtrades and suppliers detailing but not limited to: hours of delivery; site access procedures and restrictions; use of existing facilities.
- .8 Contractor to prepare detailed and accurate written record of all meetings to be kept and issued to all parties.

3.13 CONTRACTOR'S HEALTH AND SAFETY COMMITTEE MEETINGS

- .1 As required in item 3.1.2, the Contractor shall form a Health and Safety Committee, hold meetings and record minutes of meetings for the duration of the Contract.
- .2 Contractor to maintain a copy of Health & Safety Committee minutes on site for review by Ministry of Labour or Board representative(s).

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Health and safety considerations required to ensure due diligence towards health and safety on construction sites, and meets the requirements laid out Occupational Health and Safety - Construction.

1.2 RELATED SECTIONS

- .1 These specifications apply to all divisions of this project specification. It is the responsibility of the Contractor to apply these provisions wherever practical within specification limits to all products and services used on this project.
- .2 Recognized that currently specified materials and methods may conflict with the basic intention of this section. Where reasonable alternate materials and methods exist that are not specified here, and that do not compromise quality or create additional cost for the Owner, notify the Consultant of such alternate materials or methods. Do not proceed to use alternate materials or methods to those specified without the express approval of the Consultant.
- .3 Elsewhere, apply the provisions of this section to all work. Exceptions can only be made when signed off by the Consultant. Suitability of all products used is the responsibility of the Contractor.

1.3 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .3 Province of Ontario
 - .1 Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. [1990 June 2002].

1.4 COMPLIANCE SPECIFICATION

- .1 The Contractor must comply with all applicable health, safety and environmental regulations.

1.5 BEYOND COMPLIANCE SPECIFICATION

- .1 These specifications apply in addition to all applicable health, safety and environmental compliance regulations. They are incorporated here to reflect the Owner's intention to develop a specification which maximizes environmentally "friendly" materials and methods wherever possible within current technical and budget limitations.
- .2 Beyond compliance specifications recognize that performance well beyond the minimum regulatory standard is often desirable, possible and affordable, often with no cost or low

cost options. It also recognizes that application methods or protocols may be as important as the material specified. Therefore these specifications cover both material and methods.

- .3 The primary goal of beyond compliance specification is to reduce the use of products or methods which have negative health and environmental impacts both during and after construction. These considerations may include full life cycle impacts, associated with raw materials, manufacturing, transport, deconstruction and their eventual fate.
- .4 These specifications will specifically address primary categories of readily identifiable products, ingredients and methods.
- .5 These provisions apply to both indoor and outdoor applications equally.

1.6 EXCEPTIONS

- .1 These specifications recognize that not all substitutes are equal and therefore exceptions can be made based on substantive evidence of necessary and superior performance. Special considerations may be given to restricted substances when secondary provisions are made such as sealed in place (contained) applications. All such exceptions must be approved in writing by the Consultant.

1.7 PRODUCTS OR SUBSTANCES TO BE AVOIDED OR LIMITED IN USE

- .1 No product containing the following substances may be used on this project when an equivalent product without or with a lower concentration of this substance is suitable and available. All products containing substances which are known to cause health effects including but not limited to cancer, mutagenic, neurological, or behavioral effects should be avoided if suitable substitutes not containing or containing lower concentrations are available. This provision shall be limited to information contained on Material Safety Data Sheets, therefore MSDS sheets must be reviewed for all products for which such sheets are required. Applications for exceptions must be accompanied by related MSDS and product application and performance sheets, clearly showing a need for the exception.

1.8 VOLATILE ORGANIC COMPOUNDS

- .1 No product containing volatile organic compounds (in over simplified terms volatile petro chemical or similar plant derived solvents) may be used on this project when a suitable non VOC or failing that a low VOC substitute is available. Manufacturers may refer to the U.S. EPA definition of VOC's for guidance or alternatively use the low molecular weight organic compound descriptor.
 - .1 Example: Paints, Coatings, Primer, Adhesives, Chalks, Firestops, etc.
- .2 Waterborne equivalents are available for most of the solvent borne products used in construction and in most cases would be the preferred alternative. Waterborne products may in some instances have high VOC contents; therefore the fact that a product is waterborne does not automatically make it acceptable.

1.9 CHLORINATED SUBSTANCES

- .1 Poly Vinyl Chloride (vinyl) and other chlorinated products should be avoided if suitable substitutes are available.

1.10 PLASTICIZERS

- .1 Plasticizers which off-gas (low molecular weight) should be avoided.

1.11 MAN MADE MINERAL FIBRES

- .1 Products containing mineral fibres which can be emitted or abraded should be avoided.
 - .1 Examples: duct liner, mineral fibre ceiling tiles, etc.

1.12 RADIATION

- .1 Products or methods which result in the lowest emission of Electro Magnetic Fields are preferred.

1.13 BIOCIDES

- .1 Products containing biocides (pesticides, miticides, mildewicides, fungicides, rodenticides, etc.) are not to be used if suitable alternatives are available. Highly stable, low human toxicity biocides such as Portercept may be acceptable substitutes. Biocide formulas which break down, emit powders or offgass should be avoided.

1.14 HEAVY METALS

- .1 Heavy metals such as lead, cadmium, mercury etc. should be avoided.

1.15 ALUMINUM

- .1 Raw aluminum should be avoided, anodized or factory painted aluminum is acceptable. This is particularly applicable to surfaces which people can touch.

1.16 OZONE DEPLETING SUBSTANCES

- .1 Products which contain or which use Ozone Depleting Substances such as Bromide, Chlorofluorocarbons (CFC) or Hydrofluorocarbons (HFC) etc. should be avoided if suitable substitutes are available.

1.17 GREENHOUSE GASES

- .1 Products which contain, use or generate Greenhouse gasses such as CO2 should be avoided if suitable substitutes are available.

1.18 BITUMINOUS (Tar) PRODUCTS

- .1 Products containing tar compounds should not be used if suitable substitutes are available.

1.19 CHEMICAL COMPOUNDS

- .1 Products containing the following chemical compounds should not be used if suitable substitutes are available: Neoprene, Latex, Butyl, ABS, and Formaldehyde.

1.20 ADHESIVES

- .1 Adhesives containing solvents or other non preferred ingredients should be avoided if suitable substitutes are available, including systems designs which do not need adhesives or can use mechanical etc. fastening alternatives

1.21 COMPOSITE PRODUCTS

- .1 Some composite products contain adhesives such as formaldehyde which are not preferred, and some composites such as Fibre Reinforced Plastics are not practical for recycling. These products should be avoided if suitable substitutes are available.

1.22 CLEANERS AND SOLVENTS

- .1 Products, equipment, and methods which require the use of cleaners and solvents are not preferred if suitable substitutes are available. Examples of preferred products would include No Wax floors, or primerless caulks and adhesives, or products not requiring caulks and adhesives.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 FIRES

- .1 Fires and burning of rubbish on site not permitted.

1.2 DISPOSAL OF WASTES

- .1 Do not bury rubbish and waste materials on site.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.3 DRAINAGE

- .1 Refer also to Section 31 23 10.
- .2 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .3 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .4 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.4 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties where indicated.
- .2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Restrict tree removal to areas indicated or designated by Engineer.

1.5 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under previous contract and to be provided new under this contract and as requested by local Municipal and Regional Authorities.
- .2 Install, maintain, restore, replace sediment control fence as required by Municipal and Regional authorities. The fence shall be in accordance with Municipal standards.
- .3 Install, maintain, restore, replace roadside catchbasin sediment protection at all street catch basin in accordance with Municipal standards.

- .3 Install, maintain, restore, replace catchbasin sediment barrier immediately after installation of catch basins on the property in accordance with Municipal Standards.
- .4 If shown on drawings, install and maintain a temporary mud mat as part of the base contract price. Maintain in good condition to avoid contaminating public streets and sewers. Remove and reinstate surfaces as part of the contract.
- .5 Control emissions from equipment and plant to local authorities emission requirements.
- .6 Prevent sandblasting, concrete block cutting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
- .7 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Inspection and testing, administrative and enforcement requirements.
- .2 Tests and mix designs.
- .3 Mock-ups.
- .4 Mill tests.
- .5 Equipment and system adjust and balance.

1.2 RELATED SECTIONS

- .1 Section 1 33 00 - Submittal Procedures.
- .2 Section 01 78 00 - Closeout Submittals.
- .3 Section 01 11 00, article 1.14 – Quality Control

1.3 REFERENCES

- .1 Stipulated Price Contract.

1.4 INSPECTION

- .1 General: Materials and workmanship shall be subject to inspection at any time. Cooperate in permitting access for inspection to all places where work is being done or stock is being stored.
- .2 Owner's quality control inspection and testing is specified in the technical sections and will be paid from Cash Allowance except as otherwise specified. Contractor to be responsible to pay for inspections and retesting to verify acceptability of work requiring correction.
- .3 Allow Consultant access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .4 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant instructions, or law of Place of Work.
- .5 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .6 Consultant may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in

accordance with Contract Documents, correct such Work and pay cost of examination and correction.

1.5 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.6 PROCEDURES

- .1 Notify appropriate agency Consultant in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.7 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.

1.8 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as may be requested.
- .2 The cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work shall be appraised by Consultant and may be authorized as recoverable.
- .3 Allow sufficient time for testing, evaluation, alterations and retesting so as not to interrupt the Progress Schedule for the Project.
- .4 The Consultant may require testing of connections and special prefabricated inserts, as part of the work of this Section.

1.9 MOCK-UPS

- .1 Refer to partial list of mock ups in Section 01 33 00 - Submittal Procedures

- .2 Prepare mock-ups for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups.
- .3 Construct in all locations acceptable to Consultant.
- .4 Prepare mock-ups for Consultant's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.
- .5 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .6 If requested, Consultant will assist in preparing a schedule fixing dates for preparation.
- .7 Remove mock-up at conclusion of Work or when acceptable to Consultant.
- .8 Mock-ups may remain as part of Work only if previously agreed to by consultant and accepted as acceptable quality upon completion..
- .9 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.10 MILL TESTS

- .1 Submit mill test certificates as required of specification Sections.

1.11 EQUIPMENT AND SYSTEMS

- .1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

1.12 SEALANTS

- .1 Refer also to Section 07 92 10.
- .2 Sealants used for the various building envelope assemblies shall be selected from those specified in the respective assembly Section, and shall be coordinated with the sealant being provided under other building envelope Sections. Preferably, one sealant by the same manufacturer shall be used throughout. If different sealants are selected, from those specified, it is the responsibility of the respective Section to ensure compatibility between selected sealant, substrates, and sealants of other Sections which come in contact with the selected sealant.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Temporary utilities.

1.2 RELATED SECTIONS

- .1 Section 01 52 00 - Construction Facilities.
- .2 Section 01 56 00 – Temporary Barriers and Enclosures.

1.3 INSTALLATION AND REMOVAL

- .1 Provide temporary utilities controls in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.4 DEWATERING

- .1 Refer also to Sections 31 23 10 and 01 35 43.
- .2 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.5 WATER SUPPLY

- .1 Use of the school water supply may be acceptable providing it does not disrupt school services. Water usage from existing services is at the discretion of the school project manager. Otherwise, arrange, pay for and maintain temporary water supply in accordance with governing regulations and ordinances. Provide for water as require whether available in the vicinity of the site or not.

1.6 TEMPORARY HEATING AND VENTILATION

- .1 Pay for cost of temporary heat and ventilation used during construction, including costs of installation, fuel, operation, maintenance and removal of equipment. Use of direct-fired heaters discharging waste products into work areas will not be permitted unless prior approvals given by the Architect.
- .2 Furnish and install temporary heat and ventilation in enclosed areas, as required to:
 - .1 Facilitate progress of work.
 - .2 Protect work and products against dampness and cold.
 - .3 Prevent moisture condensation on surfaces.
 - .4 Provide ambient temperatures and humidity for storage, installation, curing of materials.
 - .5 Provide adequate ventilation to meet health regulations for safe working environment.

- .3 Maintain minimum temperature of 10 degrees C or higher where specified as soon as finishing work is commenced and maintained until acceptance of structure by Engineer.
- .4 Ventilating:
 - .1 Prevent hazardous accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Ventilate temporary sanitary facilities.
 - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful elements.
- .5 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
 - .1 Conform with applicable codes and standards.
 - .2 Enforce safe practices.
 - .3 Prevent abuse of services.
 - .4 Prevent damage to finishes.
 - .5 Vent direct -fired combustion units to outside.
- .6 The Architect may permit the use of permanent system providing agreement can be reached on:
 - .1 Conditions of use, special equipment, protection and maintenance.
 - .2 Guarantees will not be affected.
 - .3 Approval of the Owner.
7. Refer to Section 011100, item 1.30. 'Periodic Cleaning' for replacement of filters at time of final acceptance of work.

1.7 TEMPORARY COMMUNICATION FACILITIES

- .1 For duration of contract, it is expected that the Site Superintendent and General Contractor Project Manager, use and pay for cell phone services and equipment necessary for own use and communication with Owner and Consultants.

1.8 FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by [insurance companies having jurisdiction] [and] governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

1.9 POWER

- .1 Temporary power is available at the site subject to the approval of the Board Project Manager and the following:
 - .1 power connections can be made without interruption to the school's power supply during the period of school occupancy.
 - .2 the contractor can isolate power usage or itemized based on previous power usage records, such that costs for power usage by the contractor shall be tracked and paid for by the contractor.
- .2 Contractors may bid this project on the assumption that temporary power is available at the site on the basis as described above.
- .3 ~~During the tender period, determine if power will be available in the vicinity of the project site. If no power is deemed available, include costs for generation of power required to carry out the work for the duration required to complete the Project. Provide written clarification at the time of Tender of estimated costs included in the Tender Price. The Board will not consider payment of generated power unless this written clarification is provided at the time of Tender.~~
- .4 Arrange, pay for and maintain temporary electrical power supply in accordance with governing regulations and ordinances.
- .5 Install temporary facilities for power such as pole lines and underground cables to approval of local power supply authority.
- .6 Electrical power and lighting systems installed under this Contract may be used for construction requirements with prior approval of Architect, provided that guarantees are not affected. Make good damage. Replace lamps which have been used over period of three (3) months.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Construction aids.
- .2 Office and sheds.
- .3 Parking.

1.2 RELATED SECTIONS

- .1 Section 01 51 00 - Temporary Utilities.
- .2 Section 01 56 00 - Temporary Barriers and Enclosures.

1.3 REFERENCES

- .1 CCDC 2 – 2008 Stipulated Price Contract.
- .2 Canadian General Standards Board (CGSB)
 - .1 CGSB 1-GP-189M-84, Primer, Alkyd, Wood, Exterior.
 - .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN3-A23.1-/A23.2-94, Concrete Materials and Methods for Concrete Construction/Method of Test for Concrete.
 - .2 CSA-0121-M1978, Douglas Fir Plywood.
 - .3 CAN/CSA-Z321-96, Signs and Symbols for the Occupational Environment.

1.4 INSTALLATION AND REMOVAL

- .1 Provide construction facilities in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.5 SCAFFOLDING

- .1 All necessary scaffolding shall be provided and constructed according to all by-laws and safety regulations. It shall be removed promptly and completely when no longer required.
- .2 As required by Ministry or Labour, design of scaffolding or hoarding shall be by a Professional Engineer.

1.6 ACCESS

- .1 Provide and maintain adequate access to project site.
- .2 The General Contractor for this Work shall, at all times allow the Consultants, the Board, or any other Board commissioned contractor or their employees, access into the building

or around the premises, undisturbed, whether union or non-union, as may be required in the execution of other portions of the building work and installation of equipment, etc.

- .3 The General Contractor shall cooperate fully with any and all Board commissioned Contractors.

1.7 HOISTING

- .1 Provide, operate and maintain hoists & cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
- .2 Hoists & cranes shall be operated by qualified operator.

1.8 ELEVATORS

- .1 Permanent elevators may not be used by construction personnel for transporting of materials unless coordinated with the Architect or Structural Engineer.
- .2 Provide protective coverings for finish surfaces of cars and entrances.

1.9 SITE STORAGE/LOADING

- .1 Provide adequate weather tight sheds with raised floors, for storage of materials, tools and equipment which are subject to damage by weather.

1.10 CONSTRUCTION PARKING

- .1 Provide, on site, sufficient temporary parking.

1.11 OFFICES

- .1 Provide office heated to 22 degrees Celsius, lighted 750 Lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing lay down table, telephone, and facsimile machine. Pay telephone not acceptable.
- .2 Maintain in clean condition.
- .3 Provide and maintain in clean condition: two separate plans layout tables, minimum 1200 x 1800 mm each. One table shall be used by the General Contractor and subcontractors at their discretion. The second shall be provided for use by subcontractors and by the consultant or Inspection and Testing Companies during site visits or project meetings.

1.12 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

1.13 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take such precautions, as required, by local health authorities. Keep area and premises in sanitary condition.
- .3 When the school is not occupied, at the discretion of the Board Project Manager, a school washroom may be designated for contractor's use, provided it is maintained in a clean condition at all times. Otherwise, when permanent water and drain connections are completed, provide temporary water closets and urinals complete with temporary enclosures, inside building. Permanent facilities may be used on approval of Board Project Manager or Architect.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Barriers.
- .2 Traffic Controls.
- .3 Fire Routes.

1.2 RELATED SECTIONS

- .1 Section 01 51 00 - Temporary Utilities.
- .2 Section 01 52 00 - Construction Facilities.
- .3 Section 01 11 00 - Summary of Work.

1.3 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CGSB 1.189M- [84], Primer, Alkyd, Wood, Exterior.
 - .2 CGSB 1.59- [97], Alkyd Exterior Gloss Enamel.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-O121- [M1978], Douglas Fir Plywood.

1.4 INSTALLATION AND REMOVAL

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

1.5 SITE ENCLOSURES

- .1 Refer to Section 01 11 00- Summary of Work, article 1.8 'Construction Fencing' for clarification of existing fence on site.' Maintain fences in good repair.

1.6 WEATHER ENCLOSURES

- .1 Provide temporary weathertight enclosures protection for exterior openings until permanently enclosed.
- .2 Erect enclosures to allow access for installation of materials and working inside enclosure.
- .3 Design enclosures to withstand wind pressure.
- .4 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.

1.7 DUST TIGHT SCREENS

- .1 Provide dust tight screens, insulated and fire rated temporary partitions as required to separate work areas and localize dust generating activities, and for protection of workers, equipment and finished areas of work and the public.
- .2 Maintain and relocate protection until such work is complete.

1.8 ACCESS TO SITE

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.9 PUBLIC TRAFFIC FLOW

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

1.10 FIRE ROUTES

- .1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.11 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

1.12 PROTECTION OF BUILDING FINISHES

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Consultant locations and installation schedule 5 days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 EXECUTION

3.1 NOT USED

.1 Not Used

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Requirements and limitations for cutting and patching the Work.
- .2 The responsibilities of this section includes but is not limited to the following item(s), including all related labour and materials necessary to successfully complete the installation of same as detailed on the Drawings.
- .3 The cutting, removal and disposal and patching of masonry wall sections in locations of all new electrical panels and for all mechanical ducts passing through masonry walls or walls of any other construction not automatically accommodated in new work by the mason.
- .4 The cutting, removal and patching of all penetrations required for mechanical and electrical services through floors, ceilings and walls.
- .5 The supply and installation of a Portland cement based leveling skim coat as required to provide an acceptable surface for the installation of new VCT tile to any rooms as described on drawings to receive such flooring.
- .6 All other work not listed in other Sections, but detailed on the Drawings.

1.2 RELATED SECTIONS

- .1 Section 01 11 00 - Summary of Work.
- .2 Section 04 21 13- Brick Masonry
- .3 Section 01 33 00 - Submittal Procedures.
- .4 Section 08 11 14- Metal Doors and Frames
- .5 Section 08 71 15 – Finish Hardware
- .6 Section 09 91 22- Painting
- .7 Section 09 21 16- Gypsum Board Assemblies
- .8 Section 09 51 13- Acoustic Panel Ceilings
- .9 Section 10 11 25- Manufactured Specialties
- .10 Mechanical and Electrical Sections.
- .11 Individual product Sections: cutting and patching incidental to work of section. Advance notification to other sections required.

1.3 SUBMITTALS

- .1 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of any element of Project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of any operational element.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of Owner or separate contractor.
- .2 Include in request:
 - .1 Identification of Project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of Owner or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

1.4 MATERIALS

- .1 Required for original installation.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Concrete lintel block, reinforcing steel and concrete fill for openings if required at new penetrations in walls or steel lintels as may be permitted by consultant.
- .4 Portland Cement based Concrete Patching Compound compatible with new slab, precast concrete slabs or other flooring to make good a smooth, suitable surface to accept the direct application of new VCT or resilient sheet flooring.
- .5 Portland Cement based Concrete for new floor openings or floor leveling, or patching of floor openings.
- .6 All other materials not listed in other Sections, but detailed on the Drawings.

1.5 EXECUTION

- .1 The Trades requiring cuts, holes or sleeves for their work shall locate them.
- .2 Do not cut, drill or sleeve load-bearing members without obtaining prior written approval from the Consultant for each condition.
- .3 Cut holes carefully, leaving holes no longer than required, with clean, true and smooth edges.

- .4 Fit items to the tolerances established by industry 'Best Practice' standard for applicable type of work.
- .5 Make patches undetectable in the finished work. All other work not listed in other Sections, but detailed on the Drawings, is to be done in a professional manner and to the industry 'Best Practice' standard for the described work.
- .6 Execute cutting, fitting, and patching including excavation and fill if required, to complete Work.
- .7 Fit several parts together, to integrate with other Work.
- .8 Uncover Work to install ill-timed Work.
- .9 Remove and replace defective and non-conforming Work.
- .10 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .11 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .12 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .13 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .14 Restore work with new products in accordance with requirements of Contract Documents.
- .15 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .16 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material, full thickness of the construction element.
- .17 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.
- .18 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1: General

.1 SECTION INCLUDES

- .1 Progressive cleaning.
- .2 Final cleaning.

.2 RELATED SECTION

- .1 Section 01 77 00 - Closeout Procedures.
- .2 Section 01 11 00 – Summary of Work.

.3 REFERENCE STANDARDS

- .1 CCDC 2 – 2008 Stipulated Price Contract.

.4 GENERAL CLEANINESS DURING CONSTRUCTION

- .1 Refer also to Section 01 11 10, item 1.33 ‘Periodic Cleaning’ and coordinate with this Section.
- .2 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
- .3 Store volatile wastes in covered metal containers, and remove from premises daily.
- .4 Prevent accumulation of wastes which create hazardous conditions.
- .5 Provide adequate ventilation during use of volatile or noxious substances.
- .6 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .7 Provide on-site dump containers for collection of waste materials, and rubbish.
- .8 Remove waste materials, and rubbish from site.
- .9 Vacuum clean interior building areas when ready to receive finish painting, and continue vacuum cleaning on an as-needed basis until building is ready for substantial completion or occupancy.
- .10 Schedule cleaning operations so that resulting dust and other contaminants will not fall on wet, newly painted surfaces.
- .11 Sandblast and wirebrush and existing exterior finishes to be internalized within new addition.

.5 EXISTING ACOUSTIC CEILING T-BAR TRACK THROUGHOUT SCHOOL

- .1 All existing ceiling T-Bar tracks to remain are to be cleaned with TSP cleaner throughout all areas receiving new ceilings.

.6 FINAL CLEANING

- .1 At completion of Work, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean all surfaces exposed to view; leave project clean and ready for occupancy.
- .2 Employ experienced, professional cleaners, for final cleaning.
- .3 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from all sight-exposed interior and exterior finished surfaces; polish resilient and ceramic surfaces so designated to shine finish. Vacuum carpet.
- .4 Clean and polish glass and mirrors.
- .5 Repair, patch and touch-up marred surfaces to specified finish, to match adjacent surfaces.
- .6 Broom-clean paved surfaces; rake clean other surfaces of grounds.
- .7 Clean exposed ductwork, and structure.
- .8 Replace filters.
- .9 Clean bulbs and lamps and replace those burned out.
- .10 Clean diffusers and grilles.
- .11 Clean sinks, faucets, and water closets and controls.
- .12 Remove snow and ice from access to building, if applicable.
- .13 Maintain cleaning until project, or portion thereof, is occupied by Owner.
- .14 All new tiled (VCT) floors to be broom swept, wet mopped AND waxed/ polished by the Contractor. The Owner will provide materials (seal/ wax). Contractor to allow for application of three (3) coats of Owner-supplied sealer/waxes.

Products

.1 NOT USED

- .1 Not Used.

Execution

.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Section 01 11 00 - Summary of Work, article 1.44.
- .2 CCDC 2 - 2008 Stipulated Price Contract.

1.2 INSPECTION AND DECLARATION

- .1 Refer to Section 01 11 00 – Summary of Work, article 1.46 for a detailed list of requirements.
- .2 Contractor's Inspection: Contractor and Subcontractors: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
- .3 Consultant's Inspection: Consultant and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.
- .4 Completion: submit written certificate that following have been performed:
 - .1 Work has been completed and inspected for compliance with Contract Documents.
 - .2 Defects have been corrected and deficiencies have been completed.
 - .3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
 - .4 Certificates required by Fire Commissioner and Utility companies have been submitted.
 - .5 Operation of systems has been demonstrated to Owner's personnel.
 - .6 Work is complete and ready for final inspection.
- .5 Final Inspection: when items noted above are completed, request final inspection of Work by Owner, Consultant and Contractor. If Work is deemed incomplete by Owner and Consultant, complete outstanding items and request re-inspection.
- .6 Declaration of Substantial Performance: when Owner and Consultant consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance.
- .7 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .8 Final Payment: when Owner and Consultant consider final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed,

make application for final payment. If Work is deemed incomplete by Owner and Consultant, complete outstanding items and request re-inspection.

- .9 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with the Stipulated Price Contract.

1.3 CLEANING

- .1 In accordance with Section 01 74 11 – Cleaning.
- .2 Remove waste and surplus materials, rubbish and construction facilities from the site immediately following completion of work and prior to final inspection.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 As-built, samples, and specifications.
- .2 Equipment and systems.
- .3 Product data, materials and finishes, and related information.
- .4 Operation and maintenance data.
- .5 Spare parts, special tools and maintenance materials.
- .6 Warranties and bonds.
- .7 Final site survey.

1.2 RELATED SECTIONS

- .1 Section 01 45 00 - Quality Control.
- .2 Section 01 77 00 - Closeout Procedures.
- .3 Section 01 78 10 - Guarantee/Warranty Form
- .4 Section 01 91 00 - Commissioning.
- .5 Mechanical Division: Commissioning
- .6 Section 01 11 00 Summary of Work, article 1.43.

1.3 SUBMISSION

- .1 Submit one copy of completed project operation and maintenance volumes and as-built drawings in final form 15 days prior to substantial performance. For equipment put into use with Owner's permission during construction, submit Operating and Maintenance Manuals within 10 days after start-up. For items of Work delayed materially beyond date of Substantial Performance, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.
- .2 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .3 Copy will be returned after inspection with Consultant's comments.
- .4 Revise content of documents as required prior to final submittal.
- .5 Submit 2 copies of revised volumes of data in final form within 10 days after final inspection.

- .6 For contract drawings (architectural, site services, landscaping, structural, mechanical, and electrical), transfer neatly as-built notations onto second and third set and submit all three sets. Cost of only the transfer of these as-built sets into digital format is paid from Cash Allowance. Completion of digital as-built to the Consultant is a mandatory requirement of Total Completion of the Contract.
- .7 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.
- .8 If requested, furnish evidence as to type, source and quality of products provided.
- .9 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .10 Pay costs of transportation.

1.4 FORMAT

- .1 Organize data in the form of an instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf [219 x 279] mm with spine and face pockets.
- .3 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.
- .4 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.5 CONTENTS - EACH VOLUME

- .1 Table of Contents: provide title of project;
 - .1 date of submission; names,
 - .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties;
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

- .3 Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

1.6 AS-BUILTS AND SAMPLES

- .1 In addition to requirements in Sections 00 21 13 Instructions to Bidders, 01 11 00 Summary of Work and the Stipulated Price Contract terms, maintain at the site for Owner one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to the Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Consultant.

1.7 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Consultant.
- .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.

- .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 References to related shop drawings and modifications.
- .5 Specifications: legibly mark each item to record actual construction, including:
- .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, and field test records, required by individual specifications sections.

1.8 DIGITAL AS-BUILT DRAWINGS

- .1 Retain the services of a CAD drafting company acceptable to the Consultant.
- .2 Transfer to digital file all information recorded on As-Built drawings. Layering of information as per Consultant's instructions.
- .3 The Consultant will provide CAD file of contract documents.
- .4 The cost for preparing digital As-Built drawings will be deducted from the Cash Allowances.

1.9 EQUIPMENT AND SYSTEMS

- .1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.

- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports as specified in Mechanical Sections.
- .15 Additional requirements: As specified in individual specification sections.

1.10 MATERIALS AND FINISHES

- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional Requirements: as specified in individual specifications sections.

1.11 MAINTENANCE MATERIALS

- .1 On completion of project, submit to Architect two (2) copies of Operations Data and Maintenance Manual in English, made up as follows:
 - .1 Bind data in vinyl hard covered, 3 ring loose leaf binder for 215 x 280 mm size paper.
 - .2 Enclose title sheet, labeled "Operation Data and Maintenance Manual", project name, date and list of contents.
 - .3 Organize contents into applicable sections of work to parallel project's specification break-down. Mark each section by labeled tabs protected with celluloid covers fastened to hard paper dividing sheets.
- .2 Include following information, plus data specified.
 - .1 Maintenance instruction for finished surface and materials.

- .2 Copy of hardware and paint schedules.
- .3 Description, operation and maintenance instructions for equipment and systems, including complete list of equipment and parts list. Indicate nameplate information such as make, size, capacity, serial number.
- .4 Names, addresses and phone numbers of sub-contractors and suppliers.
- .5 Guarantees, Warranties and bonds showing:
 - .1 Name and address of project.
 - .2 Guarantee commencement date (date of Final Certificate of Completion).
 - .3 Duration of guarantee.
 - .4 Clear indication of what is being guaranteed and what remedial action will be taken under guarantee.
 - .5 Signature and seal of Contractor.
 - .6 Additional material used in project listed under various Sections showing name of manufacturer and source of supply.
- .3 Neatly type lists and notes. Use clear drawings, diagrams or manufacturers' literature.
- .4 Include one complete set of final shop drawings (bound separately) indicating corrections and changes made during fabrication and installation.

1.12 STORAGE, HANDLING AND PROTECTION

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and to satisfaction of Consultant.

1.13 WARRANTIES AND BONDS

- .1 Refer to Section 00 21 13 'Instructions to Bidders' for bonding requirements for this project, both at the time of tender submission and throughout the duration of the construction period.
- .2 Refer to the Stipulated Price Contract for Warranty requirements and conditions for the standard warranty which is required for the work of this contract.
- .3 Extended warranties are required to be issued by manufacturers, fabricators, suppliers and/or installers, sometimes jointly, due to their unique position in the construction process and their ability to guarantee a particular section of work. Refer to individual requirements of extended warranties requested as well as Section 01 11 00 article 1.36.
- .4 Unless specifically noted otherwise, all extended warranties shall commence on the date of Substantial Performance of the Work as certified by the Consultant.

- .5 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .6 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal. Use Guarantee/Warranty Form as provided in Section 017810 Sample Guarantee/Warranty Form, whenever standard preprinted trade or manufacturer's Guarantee/Warranty forms are not available. Provide written form for each warranty specified in Section 01 11 00 Summary of Work, Article 1.36.
- .7 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work.
- .8 Date at beginning of time of warranty start shall be Date of Substantial Performance.
- .9 Verify that documents are in proper form, contain full information, and are notarized.
- .10 Co-execute submittals when required.
- .11 Retain warranties and bonds until time specified for submittal.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

1. GENERAL

1. To be made out on the letterhead of Guarantor or Warrantor which usually is a Subcontractor.
2. This format is to be used only when standard preprinted trade or manufacturer's forms are not available. Preprinted forms are to include all elements of information shown on this sample or as a minimum.
3. Comply with Requirements for Guarantee/Warranty as specified in Section 01 78 10, Closeout Submittals.

To: The Halton Catholic District School Board

Date: _____

SECTION _____

TITLE _____

GUARANTEE/WARRANTY TO:

OWNER The Halton Catholic District School Board

PROJECT Renovations to Ascension Catholic Elementary School

ARCHITECT Hossack Architecture

REFERENCE (to specifications or drawings)

TIME Period of Guarantee/Warranty: _____ years

GUARANTEE/
WARRANTY Starting Date: Substantial Performance as certified by Consultant

Date: _____

(Description of Guarantee/Warranty)

Upon written notification from the Owner or the Consultant that the above work is defective any repair or replacement work required shall be to the Consultant's satisfaction at no cost to the Owner.

This guarantee shall not apply to defects caused by the work of others, maltreatment of materials, negligence or Acts of God.

SUBCONTRACTOR _____
Signature

Date

Authorized Signing
Officer:

(Name Printed)

Title

Name of Firm:

Address:

Telephone Number

CONTRACTOR

Signature

Date

Authorized Signing
Officer:

(Name Printed)

Title

Name of Firm:

CORPORATE SEAL

Address:

Telephone Number

END OF SECTION

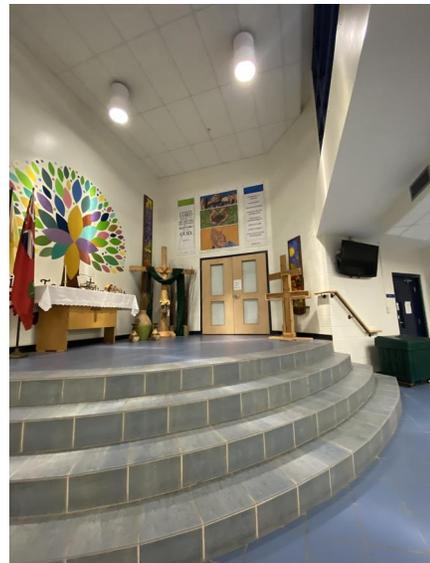
PART 1 GENERAL

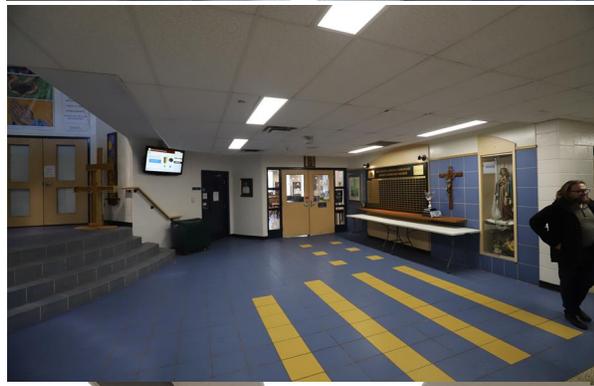
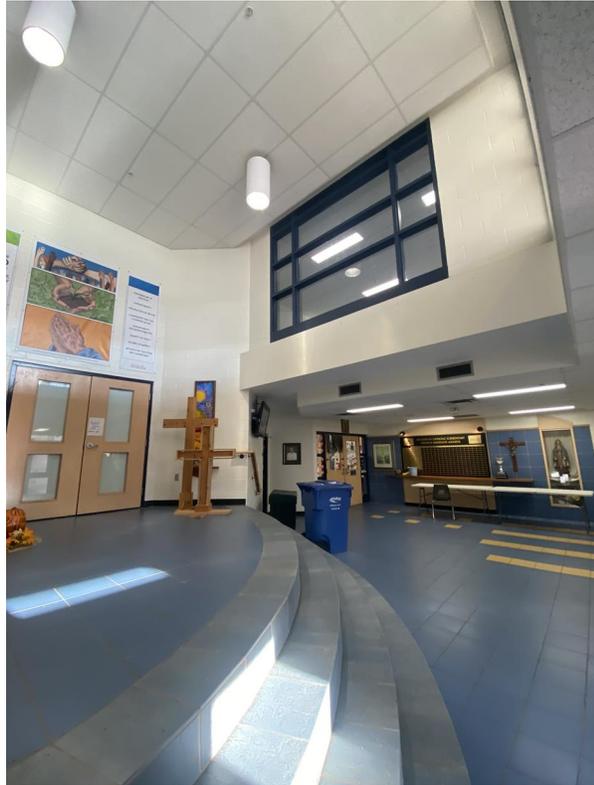
1.1 Related Sections

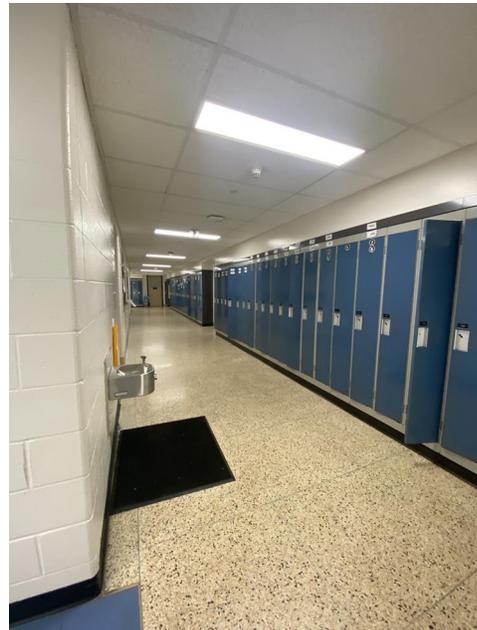
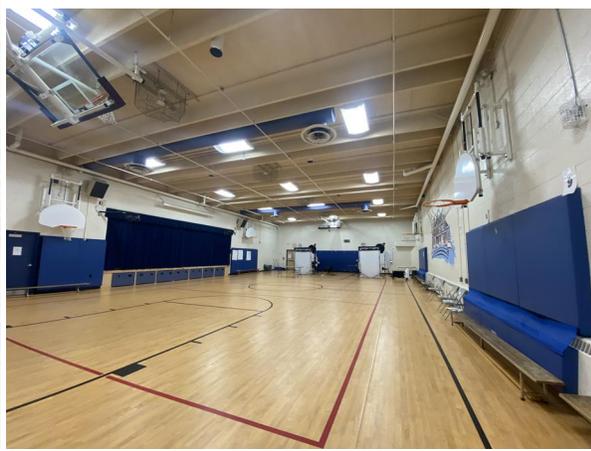
These photographs are provided for convenience only. Bidders are strongly encouraged to attend the non-mandatory Site Meeting during tender.

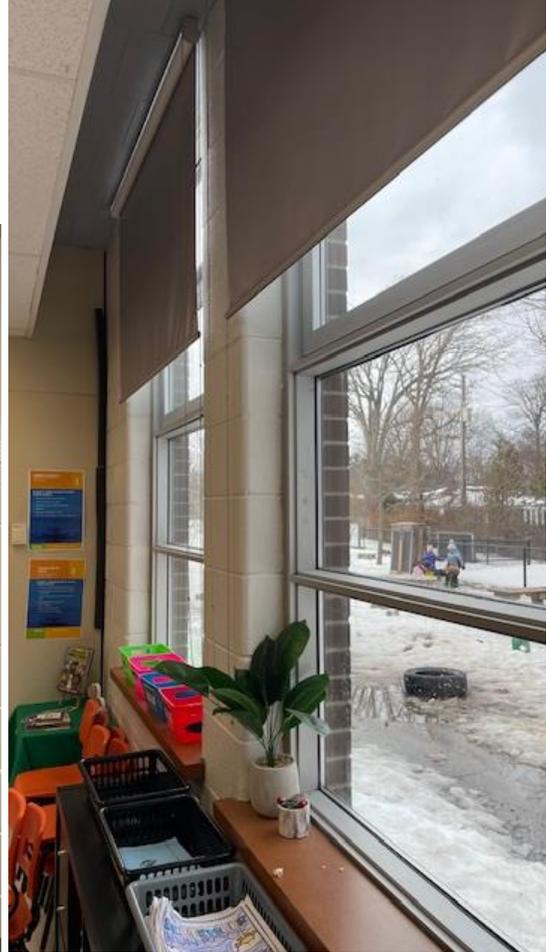
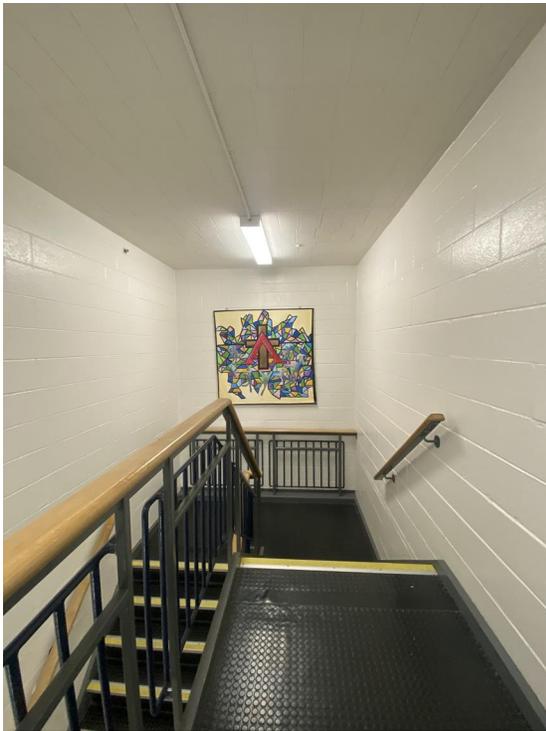
Bidders remain responsible to inspect the site and assume existing site conditions.

The following photos were taken October 2024 & January 2025.











PART 1 GENERAL

1.1 Related Sections

1. Section 01 11 00 - Summary of Work
2. Section 01 56 00 – Temporary Barriers and Enclosures
3. Section 01 73 03 – Execution Requirements (Cutting and Patching)
4. Section 04 21 13 - Block Masonry
5. Section 01 33 00 - Submittal Procedures
6. Section 08 11 14- Metal Doors and Frames
7. Section 08 71 15 – Finish Hardware
8. Section 09 91 22- Painting
9. Section 09 21 16- Gypsum Board Assemblies
10. Section 09 51 13- Acoustic Panel Ceilings
11. Mechanical and Electrical Sections

1.2 Scope

1. Scope includes but is not limited to:
 - .1 Demolition or alteration of all structural, architectural, mechanical, electrical or site components, equipment, fitments and finishes as required to execute the work.
 - .2 The removal, repair and reinstallation as required to make good of existing acoustic unit ceilings gypsum board bulkheads, windows, doors, hollow metal screens and partition walls where required to be removed for routing new services, general alterations or revising demising walls.
 - .3 Removal and reinstallation as indicated of any existing fixed in place millwork, chalkboards or tackboards or similar fitments or devices identified to remain and be reinstalled.
 - .4 Grinding and patching of walls where chalkboards or fitments have been removed and surface adhesives or similar surface deficiencies remain.
 - .5 Cutting and removal of slabs on grade to remove or replace existing drains, clean outs, oil interceptors, trenches and sub slab services contained within them, not previously removed by Abatement work.
 - .6 Making good of all walls and floors remaining where sections of walls or floors have been removed and surfaces require repair.
 - .7 Making good of all finishes to remain as result of selective demolition.

1.3 Existing Conditions

1. Take over structures to be demolished or altered based on their condition on date that tender is accepted, at time of examination prior to tendering.
2. Contractor may confirm the prior removal of all asbestos containing materials in documentation left on site following prior abatement work contract. Should areas of asbestos be found which are not documented as removed or included in the scope of this work for removal, it shall be reported to the Consultant and Owner's representative for review and instructions for removal.

3. Prior to beginning alteration or demolition, confirm with Owner that no items to be salvaged or turned over to the owner remain in the work areas.

1.4 Protection

- .1 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades parts of existing building to remain. Provide bracing, shoring and underpinning required. Make good damage and be liable for injury caused by demolition.
- .2 Take precautions to support structures and, if safety of building being demolished or adjacent structures or services appears to be endangered, cease operations and notify Consultant.
- .3 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.

Part 2 Products NOT USED

Part 3 Execution

3.1 Work

- .1 Dispose of demolished materials except where noted otherwise and in accordance with authorities having jurisdiction. Confirm in Divisions 15 and 16 for removal and re-use of mechanical and electrical materials and equipment.
- .2 Refer to drawings for furniture, materials or equipment to be removed and turned over to the owner. Carefully remove such items and store in location designated by Owner.
- .3 For a scope of work refer to all Drawings and also coordinate items to be altered, re-built, cleaned or otherwise “made good” as a result of the cutting and patching scope of work described in Section 01 73 03 Execution Requirements or other Sections.

3.2 Preparation

- .1 Disconnect electrical, telephone/PA and data service lines in work areas without disrupting main service to building and in accordance with regulations of authorities having jurisdiction. Post warning signs on electrical lines and equipment which must remain energized to serve other properties during period of demolition.
- .2 Disconnect and cap designated mechanical services in accordance with requirements of local authority having jurisdiction.
 - .1 Natural gas supply lines, if applicable to be removed by gas company by qualified tradesman in accordance with gas company instructions.
 - .2 Remove, cap or dispose of other underground services as indicated in drawings.
 - .3 Do not disrupt active or energized utilities traversing premises designated to remain undisturbed.
- .3 Floor scans to locate hidden or buried services in the work area have NOT previously been done. Prior to cutting, demolition or removal of any slabs on grade or areas where services may be concealed, engage a private locate firm to provide magnetic and X-ray scans of all areas involved. This is the responsibility of the General Contract and costs for such scans are to be included in the base contract price.

3.3 Disconnection and Removal of Materials and Equipment

- .1 Contractor shall cooperate with the Owner to determine which materials are to be removed and retained by Owner. The Owner will decide which items or equipment they wish to retain as their property and all other materials shall be removed from the premises by this Contractor. The equipment which is to be retained by the Owner shall be stored on site where directed by the Owner.
- .2 Refer to mechanical and electrical drawings and for disconnection and removal and/or relocated existing electrical, ductwork, piping and/or equipment.

3.4 Temporary Removals and Replacement

- .1 All items to be removed and installed shall be completed so that replaced materials are left in a clean undamaged state. If required to be replaced due to damage, the contractor shall include in his price for the component to be replaced and installed at no additional cost to the Contract.

3.5 Selective Demolition

- .1 Follow best trade practices for all demolition and alteration work. This includes but is not limited to the following items.
 - .1 The school will be vacant during July and August 2025. Ensure demolition work does not disrupt any ongoing aspect of the operation of the school including the period after Substantial Performance.
 - .2 Confirm all demolition work (including potential noise, vibration, tools or equipment noise, etc.) in advance with the principal of the school on a daily basis. Similarly, notify all building occupants in advance at each possible interruption in services or utilities.
 - .3 Protect all areas from damage and intrusion by means of locking rooms under construction when not in use, use of dust tight screens and temporary partitions and hoarding. Demolish to minimize dusting. Refer to drawings for locations and other Specification Sections for requirements.
 - .4 Signage to be posted at all times. Take precautions to demolish only areas as necessary to complete the work, and avoid damage to adjacent areas. Make good all areas affected by demolition or renovation activities, whether specifically included in the contract documents or not.
 - .5 The Contractor shall be responsible for damage to all areas affected by renovation or alteration activities.
 - .6 Prior to demolition, the Contractor shall carefully examine the drawings in relation to the site conditions, to ensure that all intended work can be carried out without ambiguity. Incorrect demolition of any work by the Contractor, will be back-charged to him. Any discrepancies between the drawings and the site conditions, must be reported to the Consultants immediately.
 - .7 Demolish or remove interior and exterior elements as indicated.
 - .8 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.
 - .9 At end of each day's work, leave work in safe condition so that no part is in danger of toppling or falling. Protect interiors of parts not to be demolished from exterior elements at all times.

- .10 Demolish masonry and concrete walls in small sections. Salvage existing imperial block units in coordination with Section 04 21 13 to re-use as patching in existing imperial unit masonry. Also coordinate with Section 04 21 13 for detail of edge condition required to match new Metric Units to existing Imperial block units.
- .11 Carefully remove and lower structural framing and other heavy or large objects as required. Where partial walls of exposed concrete block masonry is to remain, grind all exposed edges to a bullnose and patch as required suitable for final painting.
- .12 Do not sell or burn materials on site.
- .13 Remove contaminated or dangerous materials from site and dispose of in safe manner to minimize danger at site or during disposal, in accordance with all governing legislation.
- .14 Where applicable, saw cut existing terrazzo floor and base as required and remove to nearest metal 'panel' joint to enable replacement at a full panel. Replace with terrazzo flooring to match existing as closely as possible. Provide sample to consultant for approval.
- .15 Following demolition and removals of floor trenches, walls and fitments, coordinate with Section 01 73 03. As part of the work of this section, scarify or otherwise grind existing or new slabs in preparation for slab in-fills and a self leveler skim slab by Section 01 73 03. That Section is responsible for the provision of a backfill, slab on grade patching and self leveling skim coat where required in advance of new VCT finishes by Section 09 65 19.
- .16 Patch and make good existing wall, ceiling and floor finish with identical original materials if affected by temporary protection or by previous Abatement contract.

3.6 Repair to all Finishes and Colours

- .1 Repaint all walls in rooms or areas modified as indicated in the Finish Schedule, or as directed by the Consultant.
- .2 Repair and make good all fixtures, finishes, trims and surfaces to all floor, wall and ceiling areas in rooms or areas whether or not they have been modified or affected by the work or by previous Abatement Contract.
- .3 Existing paint colours are to be matched exactly using computer colour matching.

END OF SECTION

Part 1 General

1.1 LIMITED DESIGNATED SUBSTANCE SURVEY REPORT REFERENCE

- .1 Refer to report pertaining to hazardous materials and abatement survey and findings prepared by others bound within this document for convenience only.
- .2 This report outlines the hazardous materials discovered at this site.
- .3 Direct any questions regarding clarification regarding the Hazardous Building Material Assessment to:

1.3 DESIGNATED SUBSTANCE SURVEYS AND AUDITS

- .1 A copy of the following reports with respect to the Place of the Work has been made available as part of the Bid Documents:

Titled: **Asbestos Containing Materials - Site Report**
Ascension Catholic Elementary School
5205 New Street
Burlington, Ontario
dated October 13, 2023

Conducted by:
Maple Environmental Inc.
Walker Davidson, Project Technologist
482 South Service Rd. E, Suite 116
Oakville, Ontario L6J 2X6
Tel 905.257-4408
- .3 Abatement is required for removal of any material identified in the reports.
- .4 The specification sections related to Asbestos Survey or Abatement forms part of the Contract Documents but contains information that is not prepared by the Architect or their sub consultants. The referenced asbestos reports and asbestos abatement specifications were not prepared by or under the supervision of the Architect. While every effort has been made to attempt to provide comprehensive abatement testing information for the purposes of design and tendering, the Architect claims no responsibility or liability for the accuracy of the information contained in the report.
- .4 Refer also to Division 1 and Section 01 35 30 and coordinate with this Section.

Part 2 Products

2.1

1. Refer to documents noted above.

Part 3 Execution

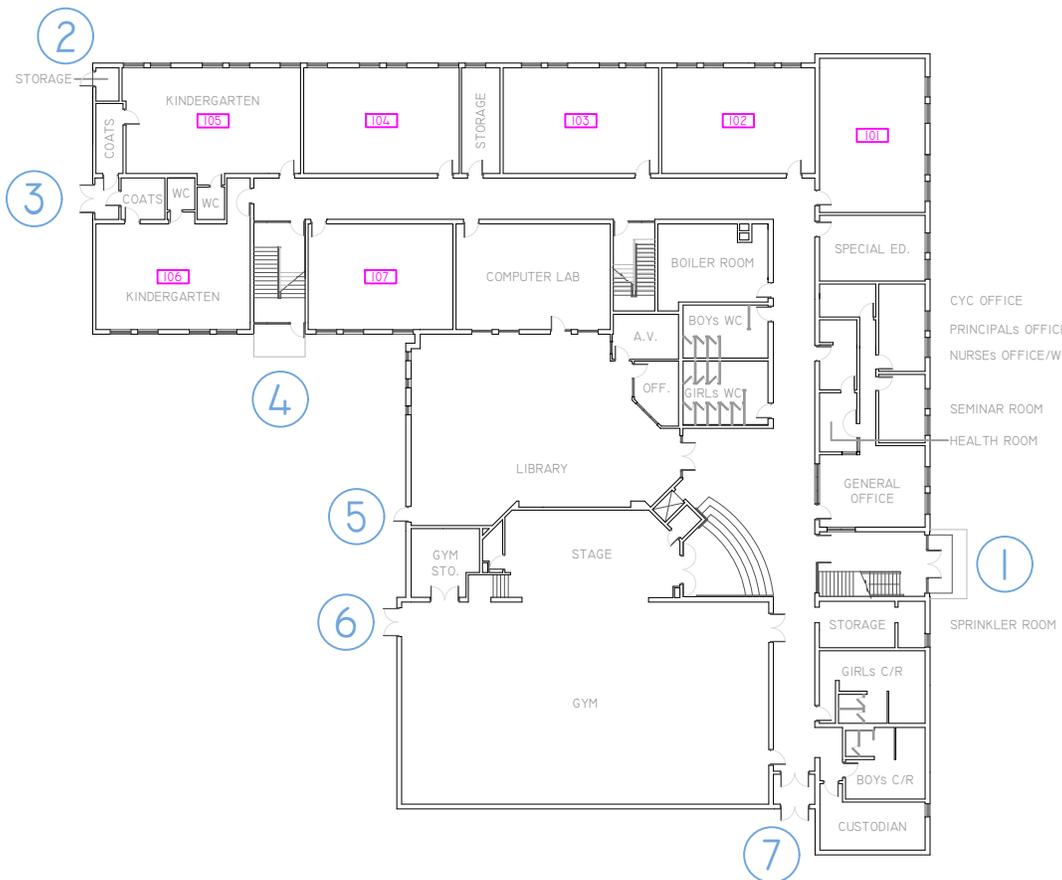
- .1 Inspection and Testing will be paid for under Cash Allowances.

END OF SECTION

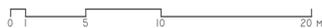
SCHOOL ROLES AND RESPONSIBILITIES – ASBESTOS CONTAINING MATERIALS

The following matrix outlines the roles and responsibilities concerning asbestos-containing materials (ACM) within the school.

Principal/Vice Principal	<ul style="list-style-type: none"> • Administer, implement and document annual review with all staff including JHSC; • Report damaged or deteriorated ACM to the Facility Manager and Custodian; • Have asbestos survey report readily accessible to all staff; • Review the asbestos survey report to be aware of the uses and locations of ACM in your facility; • Avoid disturbance of ACM during regular activities
Joint Health and Safety Committee	<ul style="list-style-type: none"> • Be aware of the types and locations of ACM in the facility



GROUND FLOOR PLAN



 TRUE NORTH
  PROJECT NORTH

ACM SYMBOL LEGEND:

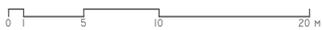
123 ACTUAL ROOM NUMBER

123 SURVEY ROOM NUMBER





SECOND FLOOR PLAN



ACM SYMBOL LEGEND:

123 ACTUAL ROOM NUMBER

123 SURVEY ROOM NUMBER



ASBESTOS CONTAINING MATERIAL SUMMARY

ROOM #	ROOM TYPE	MATERIAL	ASBESTOS CONTENT	LOCATION WITHIN SPACE	ESTIMATED QTY	FRIABLE/NON-FRIABLE	COMMENTS
16	CUSTODIAL ROOM	FLOOR TILE CONTAINING ASBESTOS REPLACED APRIL 2023					PER MAPLE ENV. REPORT MARCH 2023

*INFORMATION OBTAINED FROM SURVEY CONDUCTED BY ARCADIS DESIGN & CONSULTING IN JANUARY 2009, UNLESS OTHERWISE NOTED



Ascension Catholic Elementary School

5205 NEW STREET, BURLINGTON ONTARIO, L7L 1V3

ASBESTOS CONTAINING MATERIALS

PROJECT INFORMATION			
Client:	Halton Catholic District School Board	Date on Site:	October 3, 2023
Project Address:	Ascension Catholic School 5205 New Street, Burlington, Ontario	Date of Report:	October 13, 2023
Project Location:	Ebase 105 (Kindergarten), Ebase 106 (Kindergarten)	Project No.:	21324
Inspectors:	Walker Davidson	Page:	1 of 2+attachment

REPORT DISTRIBUTION:		
Company	Contact	Issued To
HCDSB	Steve Allum	AllumS@hcdsb.org
HCDSB	Troy Van Dyk	VanDykT@hcdsb.org

SITE REPORT TYPE		
<input type="checkbox"/> Type 1 Work Area	<input type="checkbox"/> Type 2 Work Areas	<input type="checkbox"/> Glove Bag Methods
<input type="checkbox"/> Clean Site Preparation	<input type="checkbox"/> Upper Seals	<input type="checkbox"/> Prior to Bulk Removal
<input type="checkbox"/> Bulk Removal	<input type="checkbox"/> Visual Clearance	<input type="checkbox"/> Air Monitoring
<input type="checkbox"/> Dismantle	<input type="checkbox"/> Waste Transfer	<input checked="" type="checkbox"/> Bulk Sampling

BACKGROUND

Further to your request, Maple Environmental Inc. (Maple) was retained by the Halton Catholic District School Board (HCDSB) to provide asbestos related consulting services at Ascension Catholic Elementary School located at 5205 New Street, Burlington, Ontario.

The scope of the project included the collection and analysis of vinyl floor tiles for the determination of asbestos content. Samples were collected from Ebase 105 (Kindergarten), Ebase 106 (Kindergarten) and connecting corridor as requested by the Halton Catholic District School Board (HCDSB).

Walker Davidson of Maple attended site on October 3, 2023.

BULK SAMPLING

A total of three (3) samples were collected of red and white 12"x12" vinyl floor tile and submitted for analysis.

The suspect asbestos bulk samples were analysed by EMC Scientific, an independent accredited laboratory. The analytical method follows the Ontario Ministry of Labour Code for the Determination of Asbestos from Bulk Samples. A summary of the laboratory results are provided in Table 1 below. Attachment A presents the detailed final analytical results.

Due to the presence of more than one phase of material in some of the original samples, the laboratory may have performed more than one analysis for some samples. As a result, a total of four (4) samples were analyzed.

**TABLE 1
BULK SAMPLE ANALYSIS RESULTS**

Sample Number	Sample Location	Sample Description	Results
S01A	Ebase 106	Red 12x12 Vinyl Floor Tile	None Detected
		Yellow mastic	None Detected
S01B	Ebase 105	White 12x12 Vinyl Floor Tile	None Detected
S01C	Corridor	White 12x12 Vinyl Floor Tile	None Detected

COMMENTS

Ontario Regulation 278/05 determines that a building material is asbestos-containing if it contains 0.5% or greater asbestos content by dry weight.

The analysis determined that asbestos is not present in the samples collected.

The vinyl floor tile within the Ebase 105 (Kindergarten), Ebase 106 (Kindergarten) and connecting corridor (Sample Set S01: A-C) was found **NOT** to contain asbestos. The yellow mastic associated with the vinyl floor tile was also analyzed as part of the sample set and found NOT to contain asbestos.

CONCLUSIONS

Based on the results of the current sampling, the vinyl floor tile and associated yellow mastic within Ebase 105 (Kindergarten), Ebase 106 (Kindergarten) and connecting corridor are confirmed to **NOT** contain asbestos. As such, no asbestos related recommendations are warranted at this time.

END OF REPORT

Sincerely,

MAPLE ENVIRONMENTAL INC.
Environment, Health and Safety Consultants



Walker Davidson
Project Technologist

ATTACHMENT A

LABORATORY CERTIFICATE OF ANALYSIS

Laboratory Analysis Report

To:

Walker Davidson
Maple Environmental Inc.
482 South Service Road East, Suite 116
Oakville, Ontario
L6J 2X6

EMC LAB REPORT NUMBER: A96460
Job/Project Name: Ascension CS
Analysis Method: Polarized Light Microscopy – EPA 600
Date Received: Oct 3/23 **Date Analyzed:** Oct 10/23
Analyst: John Paul Cantillon
Reviewed By: Malgorzata Sybydlo

Job No: 21324
Number of Samples: 3
Date Reported: Oct 10/23

Client's Sample ID	Lab Sample No.	Description/Location	Sample Appearance	SAMPLE COMPONENTS (%)		
				Asbestos Fibres	Non-asbestos Fibres	Non-fibrous Material
S01A	A96460-1	Red 12x12 VFT/ Rm. 106	2 Phases: a) Red, vinyl floor tile b) Yellow, mastic	ND ND		100 100
S01B	A96460-2	White 12x12 VFT/ Rm. 105	White, vinyl floor tile	ND		100
S01C	A96460-3 ⁶	White 12x12 VFT/ corridor	White, vinyl floor tile	ND		100

Note:

1. Bulk samples are analyzed using Polarized Light Microscopy (PLM) and dispersion staining techniques. The analytical procedures are in accordance with EPA 600/R-93/116 method.
2. The results are only related to the samples analyzed. **ND** = None Detected (no asbestos fibres were observed), **NA** = Not Analyzed (analysis stopped due to a previous positive result).
3. This report may not be reproduced, except in full without the written approval of EMC Scientific Inc. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government.
4. The Ontario Regulatory Threshold for asbestos is 0.5%. The limit of quantification (LOQ) is 0.5%.
5. Vinyl floor tiles may contain very fine asbestos fibres which the PLM method cannot detect. TEM analysis may be necessary to confirm the absence of asbestos.
6. Another phase is present but is too small to analyze.

PROJECT INFORMATION			
Client:	Halton Catholic District School Board	Date on Site:	May 8, 2023
Project Address:	Ascension Catholic Elementary School (5205 New Street, Burlington)	Date of Report:	May 16, 2023
Project Location:	1 st Floor Custodian Room	Project No.:	20998
Inspector:	Jason De Sousa	Page:	1 of 3 +attachment

REPORT DISTRIBUTION:		
Company	Contact	Issued To
Halton Catholic District School Board	Steve Allum	AllumS@hcdsb.org
Halton Catholic District School Board	Troy Van Dyk	VanDykT@hcdsb.org

SITE REPORT TYPE		
<input type="checkbox"/> Type 1 Work Area	<input type="checkbox"/> Type 2 Work Areas	<input type="checkbox"/> Glove Bag Methods
<input type="checkbox"/> Clean Site Preparation	<input type="checkbox"/> Upper Seals	<input type="checkbox"/> Prior to Bulk Removal
<input type="checkbox"/> Bulk Removal	<input type="checkbox"/> Visual Clearance	<input type="checkbox"/> Air Monitoring
<input type="checkbox"/> Dismantle	<input type="checkbox"/> Waste Transfer	<input checked="" type="checkbox"/> Bulk Sampling

BACKGROUND

Further to your request, Maple Environmental Inc. (Maple) was retained by the Halton Catholic District School Board (HCDSB) to provide environmental consulting services pertaining to the 1st Floor Custodian Room of Ascension Catholic Elementary School located at 5205 New Street, Burlington.

It is our understanding that a proposed re-flooring project is scheduled to occur in the future.

The purpose of the current site review was to collect location specific bulk samples of suspect asbestos-containing materials that are anticipated to be disturbed as a result of the upcoming renovation.

Jason De Sousa of Maple attended the site on May 8, 2023 to review the site conditions with the head caretaker.

ASBESTOS BULK SAMPLING

A total of three (3) bulk samples were collected of materials suspected to contain asbestos and were submitted for analysis.

The suspect asbestos bulk samples were analysed by EMC Scientific, an independent accredited laboratory. The analytical method follows the Ontario Ministry of Labour Code for the Determination of Asbestos from Bulk Samples. A summary of the laboratory results are provided in Table 1 below. Attachment A presents the detailed final analytical results.

**TABLE 1
 ASBESTOS BULK SAMPLE ANALYSIS RESULTS**

Sample Number	Sample Location	Sample Description	Results
S-01A	1 st Floor Custodian Room	Black Mastic	None Detected
S-01B		Black Mastic	None Detected
S-01C		Black Mastic	None Detected

DISCUSSION OF ASBESTOS RESULTS

Ontario Regulation 278/05 determines that a building material is asbestos-containing if it contains 0.5% or greater asbestos content by dry weight.

The floor in the 1st Floor Custodian Room consists of concrete with residual black mastic.

Three (3) representative samples (Sample Set S-01) of black mastic were collected and analyzed for the determination of asbestos content. Analysis of Sample Set S-01 confirmed that the material does not contain asbestos.

Refer to Figure 1 below to view representative photos of the non-ACM black mastic described above.

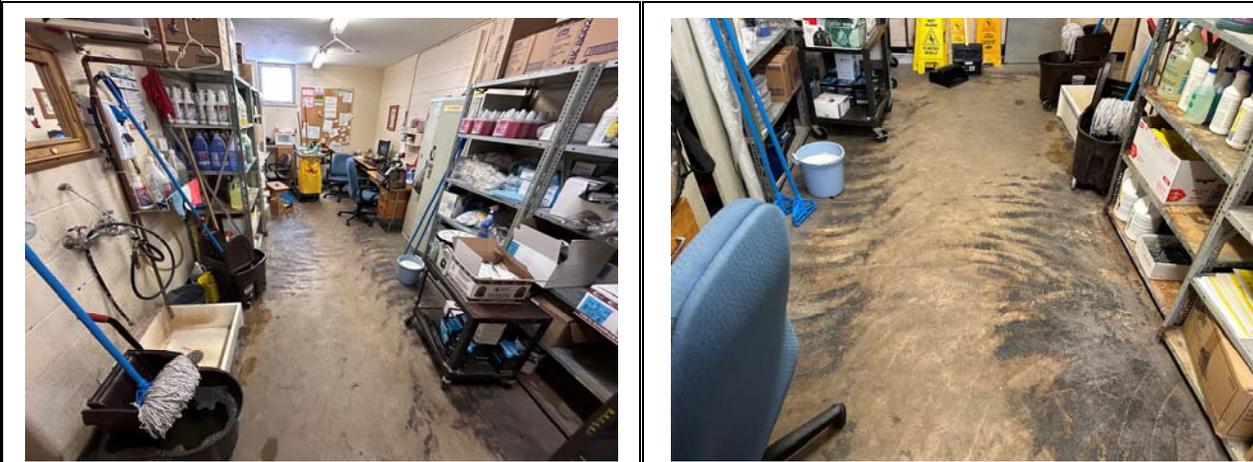


Figure 1: View of non-ACM black mastic present in the 1st Floor Custodian Room.

CONCLUSIONS & RECOMMENDATIONS

Based on our visual review of the site in conjunction with the analytical results, asbestos is confirmed to NOT be present within the exposed black mastic in the 1st Floor Custodian Room. As such, no asbestos-related recommendations are warranted at this time for the anticipated disturbance of the subject material.

END OF REPORT

Sincerely,

MAPLE ENVIRONMENTAL INC.
Environment, Health and Safety Consultants



Jason De Sousa
Operations Manager

ATTACHMENT A:

**LABORATORY CERTIFICATE OF ANALYSIS FOR
ASBESTOS SAMPLES**

Laboratory Analysis Report

To:

Jason De Sousa
 Maple Environmental Inc.
 482 South Service Road East, Suite 116
 Oakville, Ontario
 L6J 2X6

EMC LAB REPORT NUMBER: A91388
Job/Project Name: Ascension CES
Analysis Method: Polarized Light Microscopy – EPA 600
Date Received: May 9/23 **Date Analyzed:** May 16/23
Analyst: Ameerah Ngai
Reviewed By: Malgorzata Sybydlo

Job No: 20998
Number of Samples: 3
Date Reported: May 16/23

Client's Sample ID	Lab Sample No.	Description/Location	Sample Appearance	SAMPLE COMPONENTS (%)		
				Asbestos Fibres	Non-asbestos Fibres	Non-fibrous Material
S-01A	A91388-1	Black mastic/ 1 st floor custodian room	Black, mastic	ND	2	98
S-01-B	A91388-2	Black mastic/ 1 st floor custodian room	Black, mastic	ND	2	98
S-01 C	A91388-3	Black mastic/ 1 st floor custodian room	Black, mastic	ND	2	98

Note:

1. Bulk samples are analyzed using Polarized Light Microscopy (PLM) and dispersion staining techniques. The analytical procedures are in accordance with EPA 600/R-93/116 method.
2. The results are only related to the samples analyzed. **ND** = None Detected (no asbestos fibres were observed), **NA** = Not Analyzed (analysis stopped due to a previous positive result).
3. This report may not be reproduced, except in full without the written approval of EMC Scientific Inc. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government.
4. The Ontario Regulatory Threshold for asbestos is 0.5%. The limit of quantification (LOQ) is 0.5%.

PROJECT INFORMATION			
Client:	Halton Catholic District School Board	Date on Site:	March 15, 2023
Project Address:	Ascension Catholic Elementary School (5205 New Street, Burlington)	Date of Report:	March 24, 2023
Project Location:	2 nd Floor Custodian Room	Project No.:	20883
Inspector:	Jason De Sousa	Page:	1 of 3 +attachment

REPORT DISTRIBUTION:		
Company	Contact	Issued To
Halton Catholic District School Board	Steve Allum	AllumS@hcdsb.org

SITE REPORT TYPE		
<input type="checkbox"/> Type 1 Work Area	<input type="checkbox"/> Type 2 Work Areas	<input type="checkbox"/> Glove Bag Methods
<input type="checkbox"/> Clean Site Preparation	<input type="checkbox"/> Upper Seals	<input type="checkbox"/> Prior to Bulk Removal
<input type="checkbox"/> Bulk Removal	<input type="checkbox"/> Visual Clearance	<input type="checkbox"/> Air Monitoring
<input type="checkbox"/> Dismantle	<input type="checkbox"/> Waste Transfer	<input checked="" type="checkbox"/> Bulk Sampling

BACKGROUND

Further to your request, Maple Environmental Inc. (Maple) was retained by the Halton Catholic District School Board (HCDSB) to provide environmental consulting services pertaining to the 2nd Floor Custodian Room of Ascension Catholic Elementary School located at 5205 New Street, Burlington.

It is our understanding that a proposed re-flooring project is scheduled to occur in the future.

The purpose of the current site review was to collect location specific bulk samples of suspect asbestos-containing materials that are anticipated to be disturbed as a result of the upcoming renovation.

Jason De Sousa of Maple attended the site on March 15, 2023 to review the site conditions with the head caretaker.

ASBESTOS BULK SAMPLING

A total of three (3) bulk samples were collected of materials suspected to contain asbestos and were submitted for analysis. Due to the presence of more than one phase of material in some of the original samples the laboratory may have performed multiple analyses for some samples. In addition, some of the samples may not have been analysed due to the positive confirmation of asbestos in a previous sample of the same material during analysis. As a result, a total of two (2) samples were analyzed.

The suspect asbestos bulk samples were analysed by EMC Scientific, an independent accredited laboratory. The analytical method follows the Ontario Ministry of Labour Code for the Determination of Asbestos from Bulk Samples. A summary of the laboratory results are provided in Table 1 below. Attachment A presents the detailed final analytical results.

**TABLE 1
 ASBESTOS BULK SAMPLE ANALYSIS RESULTS**

Sample Number	Sample Location	Sample Description	Results
S-01A	2 nd Floor Custodian Room	Beige Vinyl Sheet Flooring	None Detected
		Off-White Vinyl Backing	30% Chrysotile
S-01B		Beige Vinyl Sheet Flooring	<i>Sample Not Analyzed</i>
S-01C		Beige Vinyl Sheet Flooring	<i>Sample Not Analyzed</i>

DISCUSSION OF ASBESTOS RESULTS

Ontario Regulation 278/05 determines that a building material is asbestos-containing if it contains 0.5% or greater asbestos content by dry weight.

One (1) visually distinct type of vinyl sheet flooring system was observed to be present in the 2nd Floor Custodian Room.

Three (3) representative samples (Sample Set S-01) of vinyl sheet flooring were collected and analyzed for the determination of asbestos content. Analysis of Sample S-01A confirmed that the off-white backing layer contains **30% Chrysotile asbestos**.

Refer to Figure 1 below to view a representative photo of the ACM vinyl sheet flooring described above.



Figure 1: View of ACM vinyl sheet flooring in 2nd Floor Custodian Room.

CONCLUSIONS & RECOMMENDATIONS

Based on our visual review of the site in conjunction with the analytical results, the following conclusions and recommendations are made:

- Asbestos has been identified within brown vinyl sheet flooring in the 2nd Floor Custodian Room.
- Removal or disturbance of ACM vinyl sheet flooring requires the use of Type 2 asbestos procedures in accordance with Ontario Regulation 278/05.

END OF REPORT

Sincerely,

MAPLE ENVIRONMENTAL INC.
Environment, Health and Safety Consultants



Jason De Sousa
Operations Manager

ATTACHMENT A:

**LABORATORY CERTIFICATE OF ANALYSIS FOR
ASBESTOS SAMPLES**

Laboratory Analysis Report

To:

Jason De Sousa
 Maple Environmental Inc.
 482 South Service Road East, Suite 116
 Oakville, Ontario
 L6J 2X6

EMC LAB REPORT NUMBER: A89397
Job/Project Name: Ascension Catholic Elementary School
Analysis Method: Polarized Light Microscopy – EPA 600
Date Received: Mar 16/23 **Date Analyzed:** Mar 23/23
Analyst: Rahul Patel
Reviewed By: Malgorzata Sybydlo

Job No: 20883
Number of Samples: 3
Date Reported: Mar 24/23

Client's Sample ID	Lab Sample No.	Description/Location	Sample Appearance	SAMPLE COMPONENTS (%)		
				Asbestos Fibres	Non-asbestos Fibres	Non-fibrous Material
S-01 A	A89397-1	Damaged vinyl sheet flooring	2 Phases: a) Off white, vinyl flooring b) Off white, vinyl backing	ND Chrysotile	30	100 40
S-01 B	A89397-2	Damaged vinyl sheet flooring	NA	NA		
S-01 C	A89397-3	Damaged vinyl sheet flooring	NA	NA		

Note:

1. Bulk samples are analyzed using Polarized Light Microscopy (PLM) and dispersion staining techniques. The analytical procedures are in accordance with EPA 600/R-93/116 method.
2. The results are only related to the samples analyzed. **ND** = None Detected (no asbestos fibres were observed), **NA** = Not Analyzed (analysis stopped due to a previous positive result).
3. This report may not be reproduced, except in full without the written approval of EMC Scientific Inc. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government.
4. The Ontario Regulatory Threshold for asbestos is 0.5%. The limit of quantification (LOQ) is 0.5%.



Asbestos abatement performed by McGowan March 2023, to remove vinyl sheet flooring in 2nd floor custodial room. See report from Maple Environmental, March 2023.

Allies Contracting installed new tile flooring April 2023.

McGowan Insulations Ltd.

345 Barton Street
 STONEY CREEK, Ontario L8E 2L2

INVOICE

Invoice No.: 29456
 Date: 03/31/2023
 Ship Date:
 Page: 1
 Re: Order No. 2023-0358

Sold to:

Halton Catholic District School Brd
 802 Drury Lane
 BURLINGTON, Ontario L7R 2Y2

Ship to:

Halton Catholic District School Brd
 Re: Ascension Catholic ES - Type 2 Vinyl Flooring - Custodial Closet
 McGowan Project - 2023-0358

Business No.: 106103112RT

Description	Tax	Amount
Material and labour to complete the above noted project as directed		
W/E - Apr 1-23	H	963.02
Subtotal:		963.02
H - HST 13%		
HST		125.19
Shipped By: Tracking Number:		
Terms: Net 30. Due 04/30/2023.	Total Amount	1,088.21
Comment:	Amount Paid	0.00
Sold By: Dan - Asbestos	Amount Owing	1,088.21

McGOWAN INSULATIONS LTD.

H.C.D.S.B.

W/E

Apr-01-2023

Ascension Catholic ES - Type 2 vinyl flooring - custodial closet

PO

JOB#

2023-0358

Contact

Name		26	27	28	29	30	31	1	Total	Rate	Amount	
B Perry	Reg								0	\$ 86.00	\$ -	
	x 1.5					6			6	\$ 112.50	\$ 675.00	
	Reg								0	\$ -	\$ -	
	x 1.5								0	\$ -	\$ -	
									Total	Reg	0.00	\$ -
									Total	x 1.5	6.00	\$ 675.00
										Labour Total		\$ 675.00

Material

Qty	Unit	DESCRIPTION	Rate	Amount
1	days	Service Vehicle	\$ 85.00	\$ 85.00
0.25	roll	rip proof poly	\$ 70.00	\$ 17.50
2	ea	Yellow Bags	\$ 1.30	\$ 2.60
2	ea	Clear Bags	\$ 1.10	\$ 2.20
2	ea	Disposal Bags	\$ 18.00	\$ 36.00
1	roll	3" Tape	\$ 15.00	\$ 15.00
1	pr	Cut Resistant Gloves	\$ 10.00	\$ 10.00
2	ea	Tyvek Suits	\$ 8.25	\$ 16.50
1	ea	P100 Filters	\$ 10.00	\$ 10.00
2.5	lbs	rags	\$ 2.00	\$ 5.00
1	days	HEPA vacuum	\$ 45.00	\$ 45.00
1	ea	vacuum bag	\$ 14.50	\$ 14.50
1	ea	sprayer	\$ 15.00	\$ 15.00
				\$ -
				\$ -
				\$ -

Material	\$ 274.30
OH - 5%	\$ 13.72
Labour	\$ 675.00
Total	\$ 963.02

**REPORT
TO
HALTON CATHOLIC DISTRICT SCHOOL BOARD**

**SURVEY OF
ASBESTOS-CONTAINING MATERIALS
ASCENSION CATHOLIC ELEMENTARY SCHOOL
BURLINGTON, ONTARIO**

Prepared by:

DECOMMISSIONING CONSULTING SERVICES LIMITED

121 Granton Drive, Unit 11
Richmond Hill, Ontario L4B 3N4
CANADA

Tel: (905) 882-5984
Fax: (905) 882-8962
E-Mail: engineers@dcsltd.ca
Web Page: www.dcsltd.ca

January 2009

70016





121 Granton Drive
Unit 11
Richmond Hill, Ontario
Canada L4B 3N4

DECOMMISSIONING CONSULTING SERVICES LIMITED

Tel: (905) 882-5984
Fax: (905) 882-8962
E-mail: engineers@dcsltd.ca
Web Site: <http://www.dcsltd.ca>

70016

13 January 2009

Halton Catholic District School Board
802 Drury Lane
P.O. Box 5308
Burlington, Ontario
L7R 4L3

Attention: Mr. Alex Duffield

Re: **Survey of Asbestos-Containing Materials
Ascension Catholic Elementary School
Burlington, Ontario**

Dear Sirs:

We are pleased to submit our report on the survey of asbestos-containing materials.

We trust that this report meets your current requirements. Please call if you have any questions or if you require further assistance.

Yours very truly,

DECOMMISSIONING CONSULTING SERVICES LIMITED


for **Ada Nguyen**
Technical Specialist


Rein Andre
Manager, Hazardous Materials Group

:atn

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2.1	SURVEY	2-1
2.2	ASSESSMENT.....	2-1
3.0	SURVEY RESULTS	3-1
4.0	DISCUSSION	4-1
5.0	USE AND LIMITATIONS OF THIS REPORT	5-1

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3.1	Summary of Laboratory Analysis of Bulk Samples	3-2
3.2	Summary of Asbestos-Containing Materials	3-3

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AT REAR OF REPORT

- A Floor Plans
- B Laboratory Reports – EMSL Analytical Inc.
- C Sample List of Suspect Asbestos-Containing Building Materials from *A Guide to the Regulation Respecting Asbestos on Construction Projects and in Buildings and Repair Operations*

1.0 INTRODUCTION

Decommissioning Consulting Services Limited (DCS) was retained by Halton Catholic District School Board to conduct a survey of the locations of asbestos-containing materials at Ascension Catholic Elementary School, 5205 New Street, Burlington, Ontario. The school was constructed in 1964 with additions built in 1965, 1967, and 1999.

Asbestos has been widely used in buildings, both in friable applications (materials which can be easily crumbled such as pipe and tank insulation, sprayed-on fireproofing and acoustic and texture coat applications) and in non-friable materials such as floor tile, fire-rated ceiling tile, gaskets, cement board, cement pipe, drywall joint compound and so on. Plaster applications (walls, ceilings, bulkheads, etc.) may also contain asbestos. The use of asbestos in friable applications was curtailed in Ontario around the mid-1970s. Most buildings constructed prior to about the mid-1970s contain some form of friable asbestos-containing material. The use of asbestos in certain non-friable products continued beyond the 1970s. A sample list of suspect asbestos-containing building materials is provided in Appendix C.

Control of exposure to asbestos is governed in Ontario by Regulation 278/05 - *Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations*. Disposal of asbestos waste (friable and non-friable materials) is governed by Ontario Regulation 278/05 and by Ontario Regulation 347, Waste Management - General.

The major requirements of O.Reg. 278/05 with respect to asbestos surveys and assessments are as follows:

Survey Records:

- non-friable asbestos-containing materials (e.g., vinyl floor tiles, ceiling tiles, drywall joint compound, plaster, etc.) are to be included in asbestos survey records effective 1 November 2007;
- asbestos survey records are to be updated:
 - (a) at least once in every 12-month period;
 - (b) whenever the owner becomes aware of new information; and

- asbestos-containing materials are to be inspected at reasonable intervals in order to determine their condition.

Bulk Samples:

- the minimum number of bulk samples to be collected from an area of homogeneous material is set out in Table 1 of the regulation (Table 1 is reproduced below).
- if analysis establishes that a bulk material sample contains 0.5 per cent or more asbestos by dry weight:
 - (a) it is not necessary to analyze other bulk material samples taken from the same area of homogeneous material; and
 - (b) the entire area of homogeneous material from which the bulk materials sample was taken is deemed to be asbestos-containing material.

TABLE 1.1
BULK MATERIAL SAMPLES
(FROM O.REG. 278/05)

ITEM	TYPE OF MATERIAL	SIZE OF AREA OF HOMOGENEOUS MATERIAL	MINIMUM NUMBER OF BULK MATERIAL SAMPLES TO BE COLLECTED
1.	Surfacing material, including without limitation material that is applied to surfaces by spraying, by trowelling or otherwise, such as acoustical plaster on ceilings and fireproofing materials on structural members	Less than 90 square metres	3
		90 or more square metres, but less than 450 square metres	5
		450 or more square metres	7
2.	Thermal insulation, except as described in Item 3	Any size	3
3.	Thermal insulation patch	Less than 2 linear metres or 0.5 square metres	1
4.	Other material	Any size	3

In practice, application of the Table 1 requirements means that the specified minimum number of negative (i.e., less than 0.5% asbestos) bulk sample analysis results will be required in order to classify a material as non-asbestos.

Corrective Actions

If asbestos-containing fireproofing or acoustical or thermal insulation has fallen and is being disturbed so that exposure to the material is likely to occur, O.Reg. 278/05 requires that the owner shall cause the fallen material to be cleaned up and, if it is readily apparent that material will continue to fall because of the deterioration, the owner shall repair, seal, remove or permanently enclose the material.

O.Reg. 278/05 classifies the asbestos work operations into three types (Type 1, 2 and 3) and specifies procedures to be followed in conducting asbestos abatement work.

2.0 METHODOLOGY

2.1 SURVEY

Site inspections were carried out by DCS staff on 30 October 2008 to determine the locations of building construction materials suspected of containing asbestos. All readily accessible areas, including spaces above accessible suspended ceilings, were inspected throughout the facility, except areas of the building constructed in 1991 or later, which were not inspected.

Representative bulk samples of material from different ages of construction were collected by DCS staff during the course of the site inspection and were forwarded to EMSL Analytical Inc. (EMSL) for analysis of asbestos content. EMSL holds a current Certificate of Accreditation for Bulk Asbestos Fibre Analysis under the Voluntary Accreditation Program (NVLAP). Determination of the locations of asbestos-containing materials were made based on results of bulk sample analysis, and on visual observations and physical characteristics of the applications at each inspection location.

2.2 ASSESSMENT

During the survey, the condition of all friable materials is assessed. Assessment involves the evaluation of a number of factors, including:

- asbestos content;
- physical damage;
- water damage;
- accessibility;
- adjacent activity, vibrations;
- air distribution system (air plenum); and
- friability.

Recommendations for appropriate corrective measures are based on findings of the assessment and consist primarily of either repair or removal (and replacement) of the asbestos-containing materials. No asbestos-containing materials were observed, and as such, there were no recommended corrected actions.

3.0 SURVEY RESULTS

On the basis of the survey work carried out, we report that no friable asbestos-containing materials were observed in Ascension Catholic Elementary School.

Glass fibre insulation is readily visually distinguishable (typically yellow in colour) from asbestos-containing insulation materials and was, therefore, not tested for asbestos content.

Visual inspections and laboratory analyses of representative bulk samples of materials confirm that no non-friable asbestos-containing materials were found to be present in the school.

Some suspended ceiling tiles were not sampled due to the post-1990 manufacturing date and some vinyl floor tiles were not sampled due to the post-1999 reported installation date.

A room-by-room summary of the locations is presented in Table 3.2. The locations of rooms are shown on the floor plans provided in Appendix A.

A summary of the results of laboratory analysis of bulk samples is presented in Table 3.1. The laboratory reports are provided in Appendix B.

TABLE 3.1**SUMMARY OF LABORATORY ANALYSIS OF BULK SAMPLES
ASCENSION CATHOLIC ELEMENTARY SCHOOL**

SAMPLE N^o	LOCATION	DESCRIPTION	ASBESTOS CONTENT
1A-JC-E1	Exit 1	Drywall joint compound	None detected
1B-JC-R01	Room 1	Drywall joint compound	None detected
1C-JC-R01C	Room 1C	Drywall joint compound	None detected
1D-JC-C1	Corridor 1	Drywall joint compound	None detected
1E-JC-C1	Corridor 1	Drywall joint compound	None detected
4A-JC-107	Room 107	Drywall joint compound	None detected
4B-JC-S2	Stairwell 2	Drywall joint compound	None detected
4C-JC-C2	Corridor 2	Drywall joint compound	None detected
4D-JC-C3	Corridor 3	Drywall joint compound	None detected
4E-JC-210	Room 210	Drywall joint compound	None detected
5A-JC-105	Room 105	Drywall joint compound	None detected
5B-JC-106	Room 106	Drywall joint compound	None detected
5C-JC-106	Room 106	Drywall joint compound	None detected
6A-PL-R12	Room 12	Plaster wall, textured	None detected
6B-PL-R12	Room 12	Plaster wall, textured	None detected
6C-PL-R13	Room 13	Plaster wall, textured	None detected

NOTES:

“Asbestos-containing material” is defined as material that contains 0.5% or more asbestos by dry weight.

TABLE 3.2

**SUMMARY OF ASBESTOS-CONTAINING MATERIALS
ASCENSION CATHOLIC ELEMENTARY SCHOOL**

LEVEL	ROOM	MATERIAL	ASBESTOS CONTENT	LOCATION WITHIN SPACE	ESTIMATED QUANTITY	FRIABLE OR NON-FRIABLE	CONDITION	COMMENTS
1	1							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999). 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	1A							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999). 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	1B							NACMO 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	1C							NACMO 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).

LEVEL	ROOM	MATERIAL	ASBESTOS CONTENT	LOCATION WITHIN SPACE	ESTIMATED QUANTITY	FRIABLE OR NON-FRIABLE	CONDITION	COMMENTS
1	1D							NACMO 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	1E							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999). 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	2							NACMO
1	3							NACMO
1	4							NACMO
1	5							NACMO
1	6							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999).
1	6A							NACMO
1	7							NACMO
1	8							NACMO
1	9							NACMO

LEVEL	ROOM	MATERIAL	ASBESTOS CONTENT	LOCATION WITHIN SPACE	ESTIMATED QUANTITY	FRIABLE OR NON-FRIABLE	CONDITION	COMMENTS
1	101							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999). 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	102							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999). 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	103							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999). 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	104							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999). 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).

LEVEL	ROOM	MATERIAL	ASBESTOS CONTENT	LOCATION WITHIN SPACE	ESTIMATED QUANTITY	FRIABLE OR NON-FRIABLE	CONDITION	COMMENTS
1	105							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999). 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	105A							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999). 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	105B							NACMO
1	105C							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999). 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	106							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999). 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).

LEVEL	ROOM	MATERIAL	ASBESTOS CONTENT	LOCATION WITHIN SPACE	ESTIMATED QUANTITY	FRIABLE OR NON-FRIABLE	CONDITION	COMMENTS
1	106A							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999). 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	106B							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999). 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	107							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999). 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	107A							NACMO 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).

LEVEL	ROOM	MATERIAL	ASBESTOS CONTENT	LOCATION WITHIN SPACE	ESTIMATED QUANTITY	FRIABLE OR NON-FRIABLE	CONDITION	COMMENTS
1	108							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999). 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	113							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999). 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	132							Area not surveyed due to reported year of construction (1999)
1	132A							Area not surveyed due to reported year of construction (1999)
1	132B							Area not surveyed due to reported year of construction (1999)
1	133							Area not surveyed due to reported year of construction (1999)
1	133A							Area not surveyed due to reported year of construction (1999)
1	133B							Area not surveyed due to reported year of construction (1999)

LEVEL	ROOM	MATERIAL	ASBESTOS CONTENT	LOCATION WITHIN SPACE	ESTIMATED QUANTITY	FRIABLE OR NON-FRIABLE	CONDITION	COMMENTS
1	137							NACMO Vinyl sheeting not sampled due to reported year of installation (post-1999).
1	137A							Area not surveyed due to reported year of construction (1999)
1	Corridor 1							NACMO 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	Corridor 2							NACMO 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	Corridor 3							NACMO 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	Exit 1							NACMO
1	Exit 7							NACMO 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
1	Stairwell 1							NACMO
1	Stairwell 2							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999).

LEVEL	ROOM	MATERIAL	ASBESTOS CONTENT	LOCATION WITHIN SPACE	ESTIMATED QUANTITY	FRIABLE OR NON-FRIABLE	CONDITION	COMMENTS
2	208B							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999).
2	209							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999). 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
2	210							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999). 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
2	217							Area not surveyed due to reported year of construction (1999)
2	Corridor 4							NACMO 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).
2	Corridor 5							NACMO 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).

LEVEL	ROOM	MATERIAL	ASBESTOS CONTENT	LOCATION WITHIN SPACE	ESTIMATED QUANTITY	FRIABLE OR NON-FRIABLE	CONDITION	COMMENTS
2	Exit 1							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999).
2	Stairwell 1							NACMO
2	Stairwell 2							NACMO 12" vinyl floor tiles not sampled due to reported year of installation (post-1999). 2' x 4' suspended ceiling tiles not sampled due to year of manufacturing (post-1990).

NOTES:

Condition: G = Good.
F = Fair.
P = Poor.

NACMO: No Asbestos-Containing Materials Observed.

NOTE!: Asbestos may also be present in locations that are presently inaccessible (e.g., in pipe chases, behind walls, above suspended gypsum board or plaster ceilings, and below carpets).

4.0 DISCUSSION

The owner of a building is required to provide information on the locations of asbestos-containing material to:

- i) any person who is an “occupier”⁽¹⁾ of the building. The occupier is then responsible for providing the information to their own employees;
- ii) any prospective constructors, contractors and subcontractors prior to requesting tenders or arranging for the demolition, alteration or repair of all or part of a building. The information to be provided shall identify whether any material that is likely to be handled, dealt with, disturbed or removed is asbestos-containing material; describe the condition of the material; state whether the material is friable or non-friable; and contain drawings, plans and specifications, as appropriate, to show the locations of material;
- iii) any employer with whom the owner arranges or contracts for work not described in ii) above that may involve asbestos-containing material or is to be carried out in close proximity to and may disturb the material;
- iv) owner’s staff, if they perform work that involves asbestos-containing material or work that is to be carried out in close proximity to and may disturb the material.

If material suspected of containing asbestos which is not identified in the asbestos survey records is discovered during the course of any work in a facility, then either the constructor or the owner is required to immediately notify (orally and in writing):

- a) an inspector at the office of the Ministry of Labour nearest the workplace;
- b) the owner;
- c) the contractor; and

⁽¹⁾ An “occupier” is defined as:
(a) a person who is in physical possession of premises, or
(b) a person who has responsibility for and control over the condition of premises or the activities carried on there, or control over persons allowed to enter the premises.

- d) the joint health and safety committee or the health and safety representative.

The owner is also responsible for providing tenderers with a list of designated substances (including asbestos) at the tendering stage of a project.

This report was prepared as part of the asbestos management program, not for the purposes of construction or renovation projects. Additional investigation and testing may be required prior to construction or renovation projects.

Bulk sampling of building materials was carried out in accordance with the minimum sampling requirements specified in Table 1 of O.Reg. 278/05. We recommend that additional samples of certain types of material which may have been mixed on site at the time of construction (plaster, drywall joint compound, ceiling texture coat, etc.) be tested for asbestos content prior to the disturbance of these materials at the time of renovations, alterations or demolition work.

Asbestos may also be present in materials which were not sampled during the course of the asbestos survey carried out by DCS, including, but not limited to, roofing materials, fire doors, mastics under vinyl flooring, acoustic ceiling tile adhesive, gaskets in piping, internal components of boilers, etc., and/or in locations that are presently inaccessible (e.g., in pipe chases, behind walls, above suspended gypsum board or plaster ceilings, and below carpets). Confirmatory testing of any such materials could be undertaken as the need arises (i.e., at the time of renovations, modifications or demolition) or the materials can be assumed to contain asbestos based on findings in adjacent areas.

5.0 USE AND LIMITATIONS OF THIS REPORT

This report, prepared for Halton Catholic District School Board, does not provide certification or warranty, expressed or implied, that the investigation conducted by DCS identified all asbestos-containing materials present in the subject facilities. The work undertaken by DCS was directed to provide information on the presence of asbestos-containing building materials based on visual inspection of readily accessible areas of the building and on the results of laboratory analysis of bulk samples of material gathered in the course of the visual inspection. The survey did not include for identification of asbestos in process materials, and equipment (including electrical equipment and wiring), nor in furniture (e.g., chairs, table tops, chalkboards, etc.).

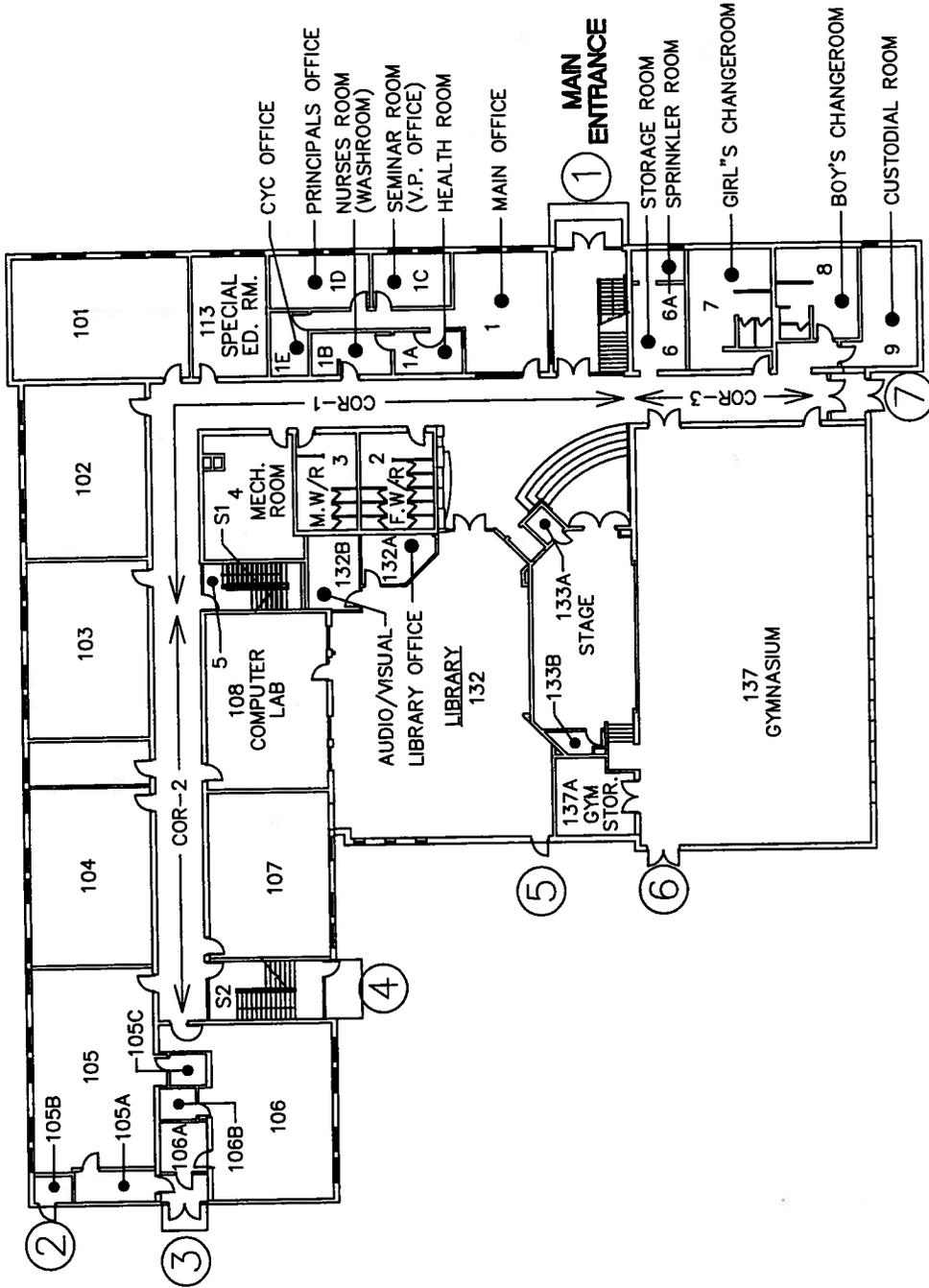
This report was prepared by DCS for Halton Catholic District School Board. Any use which a third party makes of the report, or reliance on, or decisions to be based on it, is the responsibility of such third parties.

APPENDIX A

FLOOR PLANS

LEGEND

25 FUNCTIONAL SPACE



GROUND FLOOR PLAN

NOTES:

1.

REVISIONS:

No.	Date:	By:	Revisions:

REFERENCE:

1.



DECOMMISSIONING CONSULTING SERVICES LTD.
HALTON CATHOLIC DISTRICT SCHOOL BOA

ASCENSION CATHOLIC SCHOOL
5205 NEW STREET, BURLINGTON, ONTARIO

Drawn By:	Checked By:	Date:	Scale:	Project No.:
J.C.	R.A.	JAN. 2008	N.T.S.	7001

GROUND FLOOR PLAN

Drawn By:	Checked By:	Date:	Scale:	Project No.:
J.C.	R.A.	JAN. 2008	N.T.S.	7001

19. 2008 - 11:00am - User and Admin Review of Ground Floor Plan for Ascension Catholic School

LEGEND:

26 FUNCTIONAL SPACE

NOTES:
1.

REVISIONS:

No.	Date:	By:	Revision:

REFERENCE:
1.

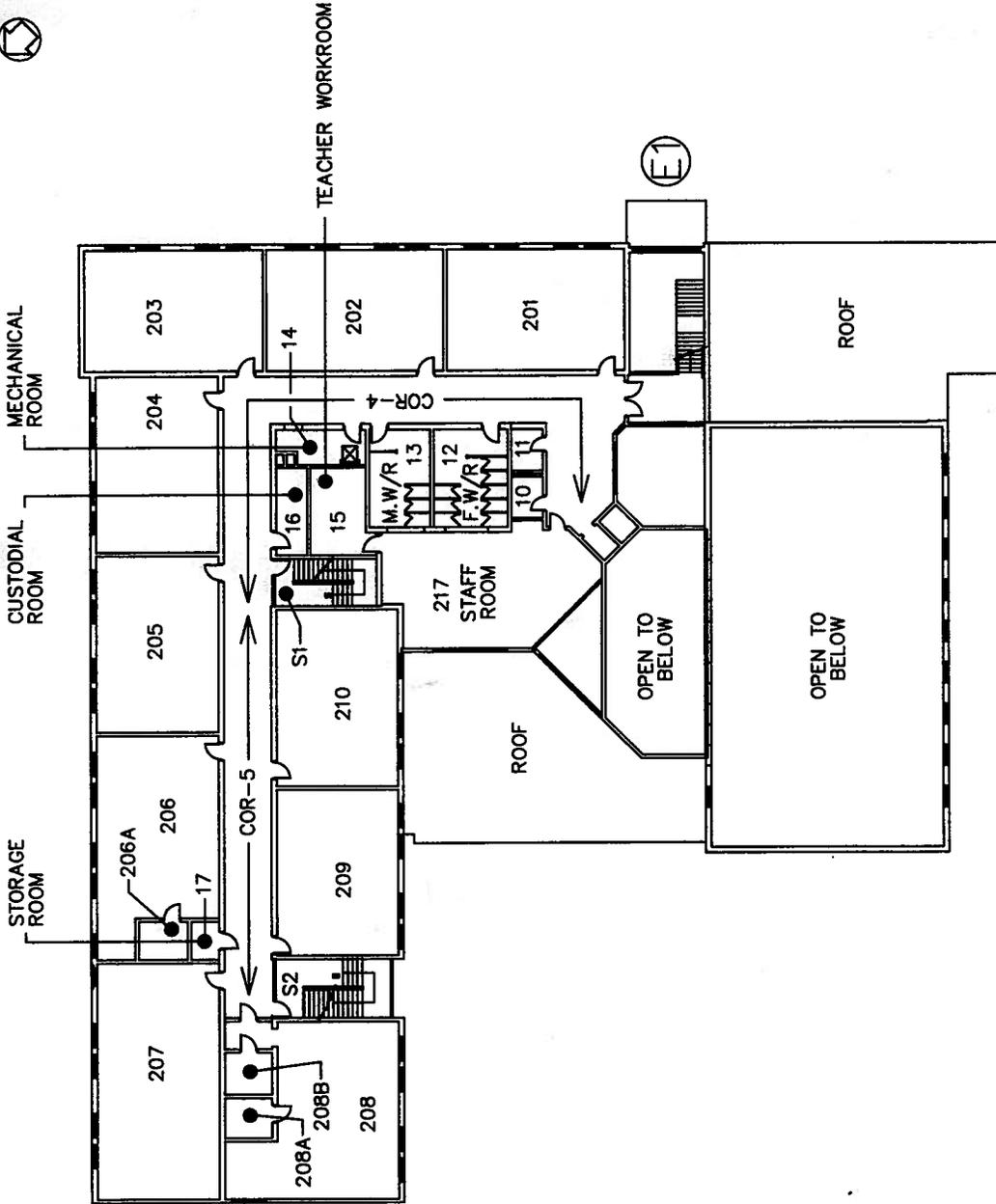


DECOMMISSIONING CONSULTING SERVICES LIMITED
HALTON CATHOLIC DISTRICT SCHOOL BOARD

ASCENSION CATHOLIC SCHOOL
6205 NEW STREET, BURLINGTON, ONTARIO

SECOND FLOOR PLAN

Drawn by: J.C. Date: JAN. 2009
 Prepared by: R.A. Date: N.T.S.
 Project No.: 70016
 Drawing No.: 70016-2



SECOND FLOOR PLAN

APPENDIX B

LABORATORY REPORTS

EMSL ANALYTICAL INC.



EMSL Analytical, Inc.

490 Rowley Road, Depew, NY 14043

Phone: (716) 651-0030 Fax: (716) 651-0394 Email: buffalob@emsl.com

Attn: **Ada Nguyen**
Decommissioning Consulting Services Ltd.
121 Granton Drive, Unit 11
Richmond Hill, Ontario, CN L4B3N4

Fax: (905) 882-8962 Phone: (905) 882-5984
Project: 70016 Ascension CS

Customer ID: DCSL97
Customer PO: 70016
Received: 11/06/08 10:00 AM
EMSL Order: 140806003

EMSL Proj:
Analysis Date: 11/12/2008
Report Date: 11/13/2008

Polarized Light Microscopy (PLM) - Point Count Performed by EPA 600/R-93/116
Method with Gravimetric Reduction and 400 Point Count

SAMPLE ID	LOCATION	APPEARANCE	(% Matrix Organic Acid)		ASBESTOS % TYPES	NON- ASBESTOS % Fibrous	NON- ASBESTOS % NON-FIBROUS
6A-PL-R12 140806003-0014	room R12 plaster wall, textured	Gray/Pink	11.2	45.0	None Detected		43.7 Non-fibrous (other)
6B-PL-R12 140806003-0015	room R12 plaster wall, textured	White/Gray	23.9	33.1	None Detected		43.0 Non-fibrous (other)
6C-PL-R13 140806003-0016	room R13 plaster wall, textured	Blue/Gray	4.9	40.1	None Detected		54.9 Non-fibrous (other)

Analytical Sensitivity <0.5% Asbestos.

Analyst(s) _____
Andrew Maciejewski (2)
Rachel Giese (1)

Rhonda McGee, Laboratory Manager
or other approved signatory

Disclaimers: Some samples may contain asbestos fibers present in dimensions below PLM resolution limits. EMSL Analytical Inc. suggests that samples reported as <0.25% or none detected undergo additional analysis via TEM. The above test report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL Analytical Inc. This report must not be used to claim product endorsement by NVLAP or any agency of the United States Government. EMSL Analytical bears no responsibility for sample collection activities, analytical method limitations, or the accuracy of results when requested to separate layer samples. EMSL Analytical Inc. liability is limited to the cost of sample analysis. Samples received in good condition unless otherwise noted.



EMSL Analytical, Inc.

490 Rowley Road, Depew, NY 14043

Phone: (716) 651-0030 Fax: (716) 651-0394 Email: buffalolab@emsl.com

Attn: **Ada Nguyen**
Decommissioning Consulting Services Ltd.
121 Granton Drive, Unit 11
Richmond Hill, Ontario, CN L4B3N4

Customer ID: DCSL97
Customer PO: 70016
Received: 11/06/08 10:00 AM
EMSL Order: 140806003

Fax: (905) 882-8962 Phone: (905) 882-5984
Project: 70016 Ascension CS

EMSL Proj:
Analysis Date: 11/11/2008
Report Date: 11/13/2008

Asbestos Analysis of Bulk Material via EPA 600/R-93/116. Quantitation using 400 Point Count Procedure.

Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
1A-JC-E1 140806003-0001	exit 1 drywall joint compound	White Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	None Detected
1B-JC-R01 140806003-0002	room R01 drywall joint compound	White Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	None Detected
1C-JCR01C 140806003-0003	room R01C drywall joint compound	White Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	None Detected
1D-JC-C1 140806003-0004	corridor 1 drywall joint compound	White Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	None Detected
1E-JC-C1 140806003-0005	corridor 1 drywall joint compound	White Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	None Detected
4A-JC-107 140806003-0006	room 107 drywall joint compound	White Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	None Detected
4B-JC-S2 140806003-0007	stairwell 2 drywall joint compound	White Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	None Detected
4C-JC-C2 140806003-0008	corridor 2 drywall joint compound	White Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	None Detected
4D-JC-C3 140806003-0009	corridor 3 drywall joint compound	White Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	None Detected
4E-JC-210 140806003-0010	room 210 drywall joint compound	White Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	None Detected

Analyst(s)

Andrew Maciejewski (11)
Tom Hanes (2)

Rhonda McGee, Laboratory Manager
or other approved signatory

Unless otherwise noted, the results in this report have not been blank corrected. Samples received in good condition unless otherwise noted.
Analysis performed by EMSL Buffalo (NVLAP #200056-0), NY ELAP #11606

PLMPointCount-1



EMSL Analytical, Inc.

490 Rowley Road, Depew, NY 14043

Phone: (716) 651-0030 Fax: (716) 651-0394 Email: buffalolab@emsl.com

Attn: **Ada Nguyen**
Decommissioning Consulting Services Ltd.
121 Granton Drive, Unit 11
Richmond Hill, Ontario, CN L4B3N4

Customer ID: DCSL97
Customer PO: 70016
Received: 11/06/08 10:00 AM
EMSL Order: 140806003

Fax: (905) 882-8962 Phone: (905) 882-5984
Project: 70016 Ascension CS

EMSL Proj:
Analysis Date: 11/11/2008
Report Date: 11/13/2008

Asbestos Analysis of Bulk Material via EPA 600/R-93/116. Quantitation using 400 Point Count Procedure.

Sample	Location	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
5A-JC-105 140806003-0011	room 105 drywall joint compound	White Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	None Detected
5B-JC-106 140806003-0012	room 106 drywall joint compound	White Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	None Detected
5C-JC-106 140806003-0013	room 106 drywall joint compound	White Non-Fibrous Homogeneous		100.00% Non-fibrous (other)	None Detected

Analytical Sensitivity <0.5% Asbestos.

Analyst(s)
Andrew Maciejewski (11)
Tom Hanes (2)

Rhonda McGee, Laboratory Manager
or other approved signatory

Unless otherwise noted, the results in this report have not been blank corrected. Samples received in good condition unless otherwise noted.
Analysis performed by EMSL Buffalo (NVLAP #200056-0), NY ELAP #11606

APPENDIX C

**SAMPLE LIST OF SUSPECT ASBESTOS-CONTAINING BUILDING MATERIALS
FROM *A GUIDE TO THE REGULATION RESPECTING ASBESTOS ON
CONSTRUCTION PROJECTS AND IN BUILDINGS AND REPAIR OPERATIONS***

APPENDIX C

SAMPLE LIST OF SUSPECT ASBESTOS-CONTAINING BUILDING MATERIALS

There are an estimated 3,000 products that contain asbestos. In Ontario, asbestos was widely used in sprayed-on material and in pipe and boiler insulation until 1973⁽¹⁾. The use of many other asbestos-containing materials continued until the mid-1980s. Asbestos is still used in the manufacture of a limited number of products, including some floor tiles, cement products, friction materials and textiles. The following list was adapted from the United States Environmental Protection Agency's (EPA) *Sample List of Suspect Asbestos Containing Materials*⁽²⁾. It is not an all inclusive list but is intended as a general guide to show which types of building materials may contain asbestos.

Possible Asbestos-Containing Materials in Buildings

- Acoustical Plaster
- Adhesives
- Asphalt Floor Tile
- Base Flashing
- Blown-in (Loose Fill) Insulation
- Boiler Insulation
- Breaching Insulation
- Caulking/Putties
- Ceiling Tiles and Lay-in Panels
- Cement Pipes
- Cement Siding
- Cement Wallboard
- Construction Mastics (floor tile, carpet, ceiling tile, etc.)
- Cooling Towers
- Decorative Plaster
- Ductwork Flexible Fabric Connections
- Electrical Cloth
- Electrical Wiring Insulation
- Elevator Brake Shoes
- Elevator Equipment Panels
- Fire Doors
- Fireproofing Materials
- Flooring Backing
- Heating and Electrical Ducts
- High Temperature Gaskets
- HVAC Duct Insulation
- Joint Compounds
- Pipe Insulation (corrugated air-cell, block, etc.)
- Roofing Felt
- Roofing Shingles
- Spackling Compounds
- Sprayed-on Insulation
- Taping Compounds (thermal)
- Textured Paper Products
- Vinyl Floor Tile
- Vinyl Sheet Flooring
- Vinyl Wall Coverings
- Wallboard

(1) J.S. Dupre, J.F. Mustard & R.J. Uffin, *Report of the Royal Commission on Matters of Health and Safety Arising from the Use of Asbestos in Ontario*, Ontario Ministry of the Attorney General, Toronto, Ontario, 1984, page 12.

(2) U.S. Environmental Protection Agency, <http://www.epa.gov/Region06/6pd/asbestos/asbmatl.htm>.

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 03 30 00 – Cast-in-Place Concrete
- .3 Section 04 21 13 – Masonry
- .4 Section 05 12 23 – Structural Steel
- .5 Section 05 21 00 – Steel Joist Framing
- .6 Section 05 31 00 – Steel Deck
- .7 Section 09 91 22 – Painting

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A53/A53M-02, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
 - .2 ASTM A269-02, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
 - .3 ASTM A307-02, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer
 - .2 CAN/CGSB-1.181-92, Ready-Mixed, Organic Zinc-Rich Coating
 - .3 CISC/CPMA 1 – 73B, Quick Drying, One-Coat Paint for Use on Structural Steel
 - .4 CISC/CPMA 2 – 75, Quick Drying, Primer for use on Structural Steel
- .3 Canadian Standards Association (CSA International)
 - .1 G40.20-04: General Requirements for Rolled or Welded Structural Quality Steel
 - .2 G40.21-04 (R2009): Structural Quality Steel
 - .3 CAN/CSA G164-M92 (R2003): Hot Dip Galvanizing of Irregularly Shaped Articles
 - .4 CSA S16.1-09: Limit States Design of Steel Structures
 - .5 CAN/CSA – S136-07: North American Specification of the Design of Cold-formed Steel Structural Members
 - .6 CSA W47.1-09: Certification of Companies for Fusion Welding of Steel
 - .7 CSA W59-03 (R2008): Welded Steel Construction (Metal Arc Welding)
 - .8 CSA NSS.3-1965 (r2003): Resistance Welding Qualification Code for Fabricators of Structural Members in Buildings
- .4 The Environmental Choice Program

- .1 CCD-047a-98, Paints, Surface Coatings
- .2 CCD-048-98, Surface Coatings - Recycled Water-borne

1.3 SUBMITTALS

- .1 Shop Drawings
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:
 - .1 Deliver, store, handle and protect materials in accordance with manufacturer recommendations.
- .2 Storage and Protection:
 - .1 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
 - .2 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.

Part 2 Products

2.1 MATERIALS

- .1 Steel sections and plates: to CSA-G40.20/G40.21, Grade 350W for hollow structural sections Class H and Grade 300W for Plates and Flat Shapes.
- .2 Welding materials: to CSA W59.
- .3 Bolts and anchor bolts: to ASTM A307.
- .4 Stainless steel tubing: to ASTM A269, Type 316 alloy, Seamless welded with AISI No. 4 finish.
- .5 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.2 PRIMERS, COATINGS AND SHOP PAINTING

- .1 Interior Steel in Dry Areas: Quick drying oil alkyd conforming to CISC/CPMA 2.75.

- .2 Exterior Steel, Interior Steel in Unheated Areas, Steel Embedded in Concrete: Hot dip galvanized conforming to CSA G164, minimum Z275 coating. Galvanizing of structural steel components and loose lintels: refer to Section 05 12 23.
- .3 Galvanized Coating Touch-Up: W.R. Meadows "Galvafroid" or Kerry Industries "Z.R.C." zinc rich coating or similar manufacturer containing minimum 90% zinc by weight.
- .4 Apply two (2) shop coat(s) of primer or coating as indicated above and according to manufacturers recommendations. Do not prime aluminum, stainless steel or those components to be galvanized or encased in concrete.
- .5 Use primer unadulterated, as provided by manufacturer. Paint on dry surfaces free from rust scale and grease. Do not paint when temperature is lower than 10 deg. Celsius and rising.
- .6 Clean surfaces to be field welded; do not paint.

2.3 FASTENINGS

- .1 Use nuts and bolts conforming to ASTM A307, A325, and A563 as applicable.
 - .1 For interior work, use cadmium-plated fastenings where other protection is not specified.
 - .2 For exterior work, use Type 300 or 400 stainless steel.

2.4 ANCHORS AND SHIMS

- .1 For exposed anchorage of aluminum, if applicable, use stainless steel and otherwise to match metal anchored. For non-exposed work, anchors and shims may be galvanized steel.

2.5 PIPE

- .1 To ASTM A53, extra strong steel pipe for bollards.

2.6 BITUMINOUS PAINT

- .1 Alkali-resisting to meet specified requirements of CAN/CGSB-1.108, Type 2. Use to insulate contact between dissimilar metals.

2.7 FABRICATION

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
- .5 Weld all connections where possible, and bolt where not possible unless indicated otherwise on drawings.

- .6 Weld all stainless steel by the Argon Arc Process. Grind smooth and polish joints, crevice-free, and flush without seams.

2.8 LIST OF MISCELLANEOUS METAL FABRICATIONS

- .1 This Section includes, but is not limited to the following list. Note: Galvanize all exterior items and other items noted. Prime paint all interior items.
 - .1 Anchors, Bolts, Inserts, Sleeves for work in this Section.
 - .2 Hangers and Supports (for work in this Section).

Part 3 Execution

3.1 GENERAL

- .1 Supply and install all miscellaneous metal work indicated on the Drawings and not indicated in work of other Sections in addition to items listed below.

3.2 ERECTION

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Provide components for building by other sections in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CSA-S16.1, or weld.
- .7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding. Spray or brush apply a minimum of three (3) coats of zinc-rich paint to achieve a dry film thickness of 8 mils. Apply a finish coat of aluminum paint to provide a colour blend with the surround galvanizing.

3.3 LATERAL SUPPORT:

- .1 Install deflection space and lateral support for non-load-bearing masonry walls and partitions in accordance with specified requirements of CSA-A371-94 and CSA-S304.1-94.

- .2 50.8mm x 50.8mm x 6.4mm angles 100mm long on both sides of walls at joist bridging location. Spacing not to exceed 1800mm.
- .3 Finish: Prime paint.

3.4 MASONRY WALL LATERAL SUPPORT:

- .1 Steel angle clips: 75 x 75 x 6 x 100mm

3.5 LINTELS:

- .1 As required to complete all work as part of this project. Steel lintels shall be provided over all openings including Mechanical, Electrical and Architectural Drawings and as shown on the drawings.
- .2 Steel of sizes shown on Lintel Schedule, Structural Drawings.
- .3 Provide concealed angle clips welded to lintels and anchored with bolts at lintel supports.
- .4 Finish: Prime paint for interior and galvanized for exterior locations.
- .5 Finish: Prime paint for interior and prime painted for exterior locations.

These items refer to components which are not normally supplied by the manufacturer but required to secure the Miscellaneous Specialty items.

3.6 ACCESS LADDER

- .1 Fabricate interior and exterior roof access ladders as described on drawings AD 515 & AD 517. Typical Construction is detailed on Structural Drawings.

3.7 WALL BRACKETS AND HOOKS

- .1 As shown on Drawings - prime paint.

3.8 GALVANIZED STEEL

- .1 Galvanize steel members, fabrications, and assemblies after fabrication by the hot dip process in accordance with CSA G164, minimum Z275 coating.
- .2 Galvanize bolts, nuts and washers and iron and steel hardware components in accordance with CSA G164.
- .3 Safeguard products against steel embrittlement in conformance with ASTM A143.
- .4 Design features which may lead to difficulties during galvanizing shall be pointed out prior to dipping.
- .5 The composition of metal in the galvanizing bath shall be not less than 98.0% zinc.

3.9 ERECTION

- .1 Erect work in accordance with shop drawings and in coordination with trades whose work relates to this Section
- .2 Erect work plumb, straight, square and accurately fitted with tight joints at intersections.

- .3 Where possible install work in one continuous piece.
- .4 Anchor all components to structure, walls, and floors as required with weld or other methods of anchorage approved by the Consultant.

3.10 TOUCH-UP AND REPLACEMENT

- .1 Touch-up adjacent primed surfaces burned, scratched or otherwise damaged during erection with prime paint, to match shopcoat, or galvafroid for galvanized when erection is completed.
- .2 Paint over bare areas on galvanized surfaces and welds with zinc rich paint.
- .3 Replace damaged or unacceptable materials indicated by the Consultants.

3.11 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 03 10 00 – Concrete Forms and Accessories.
- .2 Section 08 11 14- Steel Doors and Frames.
- .3 Section 07 50 13 – Common Work Results for Roofing*
- .4 Section 07 50 16 – Rough Carpentry for Roofing *coordinate responsibilities with this Section and Work Division Table in Section 07 50 13.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA B111-[1974(R1998)], Wire Nails, Spikes and Staples.
 - .2 CAN/CSA-G164-[M92(R1998)], Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA O121-[M1978(R1998)], Douglas Fir Plywood.
 - .4 CAN/CSA-O141-[91(R1999)], Softwood Lumber.
 - .5 CSA O151-[M1978(R1998)], Canadian Softwood Plywood.
 - .6 CAN/CSA-O325.0-[92(R1998)], Construction Sheathing.
 - .7 CAN/CSA-086M-01(R2006), Engineering Design in Wood.
- .2 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber [2000].

1.3 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.
- .3 Plywood, OSB and wood based composite panel construction sheathing identification: by grademark in accordance with applicable CSA standards.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Divert unused wood materials from landfill to recycling, reuse, composting facility approved by Consultant.
- .3 Do not dispose of preservative treated wood through incineration.
- .4 Do not dispose of preservative treated wood with materials destined for recycling or reuse.

- .5 Dispose of treated wood, end pieces, wood scraps and sawdust at sanitary landfill approved by Consultant.
- .6 Dispose of unused wood preservative material at official hazardous material collections site approved by Consultant.
- .7 Do not dispose of unused preservative material into sewer system, into streams, lakes, onto ground or in other locations where they will pose health or environmental hazard.

Part 2 Products

2.1 LUMBER MATERIAL

- .1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:
 - .1 CAN/CSA-O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
- .2 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:
 - .1 Douglas fir Graded 122-C, construction or No. 2 Pine, pressure treated in accordance with CSA 080M.
 - .2 Board sizes: "Standard" or better grade.
 - .3 Dimension sizes: "Standard" light framing or better grade.
 - .4 Post and timbers sizes: "Standard" or better grade.
 - .5 Fasteners: Proprietary fasteners toggle bolts, expansion shields and lag bolts, crews and lead or inorganic fire plugs, explosive actuated fastening devices, recommended for purpose by manufacture. Use stainless steel or galvanized to CSA G164-M1981 fasteners for all exterior fastening and for any damp or moist areas.
 - .6 Wood Preservatives: Surface-applied wood preservative: clear copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.
 - .7 Material shall be straight, sawn square, true, dressed four sides properly sized, shaped to correct dimensions from nominal sizes noted on Drawings.
- .3 Framing Lumber:
 - .1 Western Red Cedar species, well seasoned, processed and stamped at the same mill with appropriate grade markings. Conform to requirements of standard grading rule for Canadian Lumber of National Lumber Grades Authority (NLGA) with latest supplement, approved by Canadian Lumber Standard Administrative Board, as follows:
 - .1 Posts: 'Structural No.2 or Better' grade, with dressed smooth surfaces.
 - .2 Fence Boards and Framing: 'No.2 Clear or Better' grade with dressed smooth surfaces.

2.2 PANEL MATERIALS

- .1 Douglas fir plywood (DFP): to CSA O121, standard construction, good one side with waterproof adhesive.

2.3 ACCESSORIES

- .1 Nails, spikes, staples, screws, bolts anchors lag screws, special fastening devices and supports required for erection of all carpentry components: to CSA B111. Use galvanized components where exposed to exterior atmosphere.
- .2 Rough Hardware (cedar): Provide rough hardware such as nails, spikes, staples, bolts, nuts, washers, screws, clips, strap iron and including hardware for temporary enclosures. Nails shall be spiral type. All nails, spikes and staples shall conform to CSA B111. All rough hardware shall be galvanized unless otherwise noted.
- .3 Surface applied wood preservative: Green coloured copper naphthenate or 5% pentachlorophenol solution, water repellent preservative or same copper based preservative as used for shop impregnation, in accordance with CAN/CSA O80.
- .4 Fire retardant treatment of lumber and plywood: 'Dricon' fire retardant treatment by J. A. Biewer or approved equivalent, conforming to CAN/CSA-O80.20 and CAN/CSA-O80.27 respectively, to provide a flame spread rating of 25 or less in accordance with CAN/ULC-S102.
- .5 Tube Forms: Spirally wound, adhesive laminated fibre paper tube forms having bursting pressure of 965 kPa, coated with hot wax, diameters as required, 'Handiform', or 'Permaform' by Perma Tubes Ltd., or 'Sonotube' by Sonoco Limited.
- .6 Concrete: Minimum 20.684 MPa (3,000 psi) concrete conforming to CAN/CSA-A23.1/A23.2.

2.4 FINISHES

- .1 Galvanizing: to CAN/CSA-G164, use galvanized fasteners for exterior work and interior highly humid areas.

Part 3 Execution

3.1 GENERAL

- .1 Supply and install all other carpentry shown on drawings or as required for completion of work. Co-operate with other trades in installing items supplied by other sections, cut openings in woodwork when so required and make good disturbed surfaces.

3.2 PREPARATION

- .1 Do all wood framing in accordance with the Ontario Building Code and CAN3 - 086M - 01 - (2006).

- .2 Machine dressed work shall be slow fed using sharp cutters and finished members shall be free from drag, feathers, slivers or roughness of any kind.
- .3 Frame materials with tight joints rigidly held in place.
- .4 Design construction methods for expansion and contraction of the materials.
- .5 Erect work plumb, level, square and to required lines.
- .6 Be responsible for methods of construction for ensuring that materials are rigidly and securely attached and will not be loosened by the work of other trades.

3.3 FURRING AND BLOCKING

- .1 Supply and install furring and blocking, required.
- .2 Align and plumb faces of furring and blocking to tolerance of 1:600.

3.4 ROUGH BUCKS AND NAILERS

- .1 Install wood bucks and nailers, as indicated, including wood bucks and linings around frames for doors and windows.
- .2 Except where indicated, otherwise, use material at least 38 mm thick secured with 9 mm bolts located within 300 mm from ends of members and uniformly spaced at 1200 mm between.
- .3 Countersink bolts where necessary to provide clearance for other work.

3.5 ROOF FASCIAS, CANTS, NAILERS CURBS

- .1 Install wood cants, fascia backing, nailers, curbs and other wood supports for roofing, sheet metal fork, roof mounted equipment.
- .2 Secure with galvanized 9 mm bolts, where indicated, galvanized nails elsewhere. Locate fastenings within 300 mm from ends and uniformly spaced between. Space bolts at 1200 mm and nails at 600 mm centres, except where indicated otherwise.
- .3 Staple vapour retardant sheet strip to underside of nailers before installation. Apply strip continuous with 200 mm overlap at joints, free of wrinkles and tears, with at least 200 mm exposed for overlap on roof deck.
- .4 Install wood nailers for roof hoppers, dressed, tapered and recessed slightly below top surface of roof insulation.

3.6 SUPPORTS FOR MECHANICAL UNITS

- .1 Performed by Section 07 51 12. Refer to Details and Mechanical and Architectural Drawings and specifications.

3.7 PRESSURE TREATED WOOD

- .1 Use wood pressure treated in accordance with CSA 080M for all wood members in contact with exterior walls and roofs.
- .2 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

3.8 INSTALLATION OF HOLLOW METAL FRAMES

- .1 Set frames plumb and square in their exact location and at correct elevation. Firmly block and brace to prevent shifting. Shim up where required to ensure proper alignment dimensions from finished floor to head of frame. Install temporary wood spreaders at mid-height.
- .2 Where pressed steel frames are installed in concrete walls, secure frames to concrete using lead expansion shields and anchor bolts through pipe sleeves. Perform drilling of concrete as required. Fill recessed bolt heads flush to frame face with approved metal filler and sand smooth.
- .3 Install fire rated door frames in accordance with requirements of National Fire Code Volume 4, produced by The National Fire Protection Association (NFPA 80).

3.9 GENERAL

- .1 Supply and install all other carpentry shown on drawings or as required for completion of work. Co-operate with other trades in installing items supplied by other sections, cut openings in woodwork when so required and make good disturbed surfaces.

3.10 ERECTION

- .1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .2 Countersink bolts where necessary to provide clearance for other work.

3.11 INSTALLATION

- .1 Lay out work carefully and to accommodate work of others. Cut and fit accurately. Erect in position indicated by drawings. Align, level, square, plumb, and secure work permanently in place. Brace work temporarily as required. Join work only over solid bracing.
- .2 Bore holes true to line and to same size as bolts. Drive bolts into place for snug fit, and use plates or washers for bolthead and nut bearings. Turn up bolts and lag screws tightly when installed, and again just before concealed by other work or at completion of work.
- .3 Co-operate with work of other Sections to ensure that unity of actions will ensure orderly progress to meet construction schedule.
- .4 Provide anchors, bolts and inserts, required for attachment of the work of this Section, to those performing the work of other Sections and who are responsible for their installation.

- .5 Work shall include rough hardware such as nails, bolts, nuts, washers, screws, clips, hangers, connectors, and strap iron required for installation of work and all operating hardware required on work of this Section for temporary use.
- .6 Do not attach work by wood plugs or blocking in concrete or masonry. Use lead shields, expansion shields, concrete nails, or similar methods only as approved by the Architect.
- .7 Do not regard grounds, blocking, furring, and such other fastening provisions as shown on Drawings as exact or complete. Provide required provisions for fastening, located and secured to suit site conditions, and adequate for intended support.
- .8 Cut fastening work into lengths as long as practicable and with square ends. Erect work plumb, in true planes, and fastened rigidly in place.
- .9 Grounds around openings in cavity wall systems, under sills and thresholds to provide continuous support shall be 50mm (2") minimum thickness, preservative treated.
- .10 Install supports and furring members as required to receive components of cabinetwork.
- .11 Install blocking at roofs, as indicated on Drawings, secured permanently to structure, trimmed and levelled to accommodate roofing components, and to receive flashings.
- .12 All members shall be accurately cut to length, angle and be true to line to assure tight joints.
- .13 Correct alignment and plumb must be maintained until specified lateral bracing is installed. Cutting and altering of trusses is not permitted except by approval by the Engineer. Heavy concentrated loads must not be placed on top of trusses until permanent bracing and decking have been installed. In any event, these temporary loads must not exceed the truss design loads.

3.12 SCHEDULES

- .1 Provide electrical equipment backboards for mounting electrical equipment as indicated. Use 19mm thick plywood on 19 x 38 mm furring around spacing, perimeter and at maximum 300 mm intermediate

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 06 10 11 – Rough Carpentry.
- .3 Section 06 47 00 – Plastic Laminates.
- .4 Section 08 80 50 – Glazing.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI A208.1-[99], Particleboard.
 - .2 ANSI A208.2-[94], Medium Density Fiberboard (MDF).
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM E1333-[96], Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates From Wood Products Using a Large Chamber.
 - .2 ASTM D2832-[92(R1999)], Standard Guide for Determining Volatile and Non-volatile Content of Paint and Related Coatings.
 - .3 ASTM D5116-[97], Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-71.20-[M88], Adhesive, Contact, Brushable.
- .4 Canadian Standards Association (CSA)
 - .1 CSA B111-[74(R1998)], Wire Nails, Spikes and Staples.
 - .2 CSA O112.4-[M1977(R1999)], Standards for Wood Adhesives.
 - .3 CSA O112.5-Series-M-[1977(R1999)], Urea Resin Adhesives for Wood (Room- and High-Temperature Curing).
 - .4 CSA O112.7-Series M-[1977(R1999)], Resorcinol and Phenol-Resorcinol Resin Adhesives for Wood (Room- and Intermediate-Temperature Curing).
 - .5 CSA O115-[M1982(R2001)], Hardwood and Decorative Plywood.
 - .6 CSA O121-[M89(R1998)], Douglas Fir Plywood.
 - .7 CAN/CSA O141-[91R1999], Softwood Lumber.
 - .8 CSA O151-[M1978(R1998)], Softwood Plywood.
 - .9 CSA O153-[M1980(R1998)], Poplar Plywood.
 - .10 CSA Z760-[94], Life Cycle Assessment.
- .5 Environmental Choice Program (EPC)
 - .1 ECP-44-[92], Adhesives.

- .2 ECP-45-[92], Sealants and Caulking Compounds.
- .3 ECP-76-[98], Surface Coatings.
- .6 International Organization for Standardization (ISO)
 - .1 ISO 14040-[97], Environmental Management-Life Cycle Assessment - Principles and Framework.
 - .2 ISO 14041-[98], Environmental Management-Life Cycle Assessment - Goal and Scope Definition and Inventory Analysis.
- .7 National Electrical Manufacturers Association (NEMA)
 - .1 NEMA LD-3-[95].
- .8 National Hardwood Lumber Association (NHLA)
 - .1 Rules for the Measurement and Inspection of Hardwood and Cypress [, January 1996].
- .9 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber [, 2000].

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate details of construction, profiles, jointing, fastening and other related details.
 - .1 Scales: profiles full size, details 1/2 full size.
- .3 Indicate materials, thicknesses, finishes and hardware.

1.4 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate samples: sample size 300 x 300 mm samples of each type of paneling laminate and each type of solid wood or plywood to receive stain or natural finish.
- .3 Submit a typical prototype unit representative of the work of this section.

1.5 QUALIFICATION

- .1 Millwork manufacturer to have not less than 5 years proven first class experience in institutional millwork and shall be able to provide a maintenance bond as specified.

1.6 GUARANTEE

- .1 This architectural woodworker shall furnish the owner with a two (2) year maintenance bond, to the full value of the architectural woodwork sub-contract. Millwork contractor is to submit a letter from their insurer stating that they will provide the bond at the beginning of the project. The Guarantee shall cover replacing and/or refinishing to make good any defects in architectural woodwork due to faulty workmanship or defective

materials supplied by this architectural woodworker, which appear during a two (2) year period following the date of substantial completion of the project.

1.7 INSPECTION

- .1 Architectural woodwork shall be manufactured and/or installed to AWMAC Quality Standards and shall be subject to an inspection at the plant and site by an appointed inspector. Such inspection costs shall be paid from Cash Allowances. Shop drawings shall be submitted for review or approval before any work is commenced. Any work which does not meet the Consultant or Owner's Quality Standards shall be replaced by this architectural woodworker, at no additional cost to the owner and to the satisfaction of the consultant and the inspector.

1.8 DELIVERY, STORAGE, AND HANDLING

- .1 Protect millwork against dampness and damage during and after delivery.
- .2 Store millwork in ventilated areas, protected from extreme changes of temperature or humidity.

Part 2 Products

2.1 MATERIALS

- .1 Softwood lumber: unless specified otherwise, S4S, moisture content 10 % or less for interior work in accordance with following standards:
 - .1 CAN/CSA-O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
 - .3 AWMAC premium grade, moisture content as specified.
- .2 Hardwood lumber: moisture content 10% or less for interior work in accordance with following standards:
 - .1 National Hardwood Lumber Association (NHLA).
 - .2 AWMAC premium grade, moisture content as specified.
 - .3 Species: to be Maple unless otherwise noted.
- .3 Hardwood plywood: to CSA O115, of thickness indicated, rotary cut face veneer, birch plywood, veneer core, No. 1 grade. Select veneers to provide book match veneer strips to be 240 mm wide minimum.
 - .1 Species: to be Birch, unless otherwise noted.
- .4 Nails and staples: to CSA B111, galvanized for exterior work, interior high-humidity areas and for treated lumber; plain finish elsewhere. Use spiral thread nails except where specified elsewhere.
- .5 Particle Board core: to CAN3-0188.1-M78, Grade R, 720 kg/m³ density in thicknesses indicated.
- .6 Plywood core for shelving: to CSA 0120.

2.2 PLASTIC LAMINATE

- .1 Refer to Section 06 47 00.

2.3 CABINET HARDWARE

- .1 Furnish and install all hardware to custom casework as follows:
 - .1 Cupboard Doors - 19 mm thick.:
 - .1 Hinges 200 Series 110° Salice
 - .2 Roller Catches 807N 2G (SgDr) Onward
 - .3 Elbow Catches T03222 C15 (DhDr)
 - .4 Door Pulls CBH235-3 1/2" C32D
 - .5 Cupboard Locks 8703/8704 14a National
 - .2 Shelving:
 - .1 Plaster strips KV255 Zinc Knappe & Vogt
 - .2 Shelf Clips KV256 Zinc Knappe & Vogt
 - .7 Display Case:
 - .1 Pilaster Strips: Brush Finish
 - .2 Shelf Brackets: Brush Finish
 - .3 Aluminum sliding track, top and bottom to accommodate sliding glass doors
 - .4 Lock sets and all required hardware for sliding glass door display system
 - .5 Glazing: 12mm tempered glass for shelves. 8mm tempered glass for sliding doors. Glazing to display cases to be provided by Section 08 80 50 and installed by the Section 06 40 00.
- .2 This section shall also include accessories such as rubber door silencers (2 per drawer or door), and other items necessary for the completion of the millwork.
- .3 Cabinet Keying: Key all cabinet and drawer locks alike for the entire school, except teachers' closets.

2.4 PLASTIC LAMINATE CABINETWORK

- .1 All cabinet frames whether for base, wall or tall floor standing cases, shall be fabricated so each is a self-contained module. Front side top and bottom, exterior and interior surfaces shall be finished allowing future relocation of any module, into any bench arrangement, without need of any additional finishing.
- .2 Gables and panels shall be fabricated from 19 mm thick plastic laminate surfaced panels with a plastic laminate applied to exposed edges.
- .3 Rails shall be fabricated and machined to join the gables and form a rigid cabinet frame.
- .4 Tops (applies to wall and tall units only) shall be fabricated utilizing the same material and edge finish as gables.
- .5 Backs in base cupboards shall be fabricated from a 6 mm hardboard.

- .6 Shelves shall be fabricated from 19 mm birch plywood with solid birch edge and lacquer finish. All shelves shall be adjustable at 13 mm increments and each will be supported by a shelf support resting in four pilaster strips attached to the gables.
- .7 Doors shall be fabricated from 19 mm thick plastic laminate surfaced panels. All four edges shall be P.V.C. edging.
- .8 Drawer fronts shall be fabricated utilizing the same material and edge finish as doors. All four edges shall P.V.C. edging. Fronts will be secured to drawer bodies with five screw nails through the front of the drawer body into the core of the drawer front.
- .9 Drawer bodies shall consist of box construction fabricated from 13 mm birch plywood with solid birch edge, front, sides and back with a 6 mm hardboard bottom dadoed and glued into box members. Joint front, sides and back with carefully fitted glued and tenoned joints. Alternately, Blum Metabox drawer body and side can be used.
- .10 Solid hardwood glazed door fronts and frames shall receive lacquer finish. Glazing shall be 3mm tempered clear glass.
- .11 Finish:
 - .1 Plastic Laminate surfaced panels shall be finished both sides in the same colours, patterns, and grain as selected by the Consultant.
 - .2 Solid hardwood glazed doors and drawer bodies shall be sanded, then sealer coated, and sanded with two finish coats of catalytic type acid resistant varnish.

2.5 **PLASTIC LAMINATE on PLYWOOD cabinetwork**

Refer to AD drawings (binder C) for locations

- .1 Plastic Laminate factory glued to plywood core, thickness as shown or specified.
- .2 Plastic laminate graphics to be book matched or run in same direction where applicable. All exposed finished casework, drawer, cupboard and door fronts shall have vertical grain orientation.
- .3 Use solid hardwood for exposed edges, typical for Library/Learning Commons millwork.
- .4 Case bodies: ¾" plywood, finish with plastic laminate factory adhered. Typical for gables and panels
- .6 Backs: ¼" plywood, finished with plastic laminate. Backs in wall and tall cabinets shall be securely glued and screw nailed into the check out provided in the backs of gables, tops, and bottoms.
- .7 Shelving: ¾" plywood, finish with plastic laminate factory adhered. All shelves shall be adjustable at 13mm increments and each will be supported by a shelf support resting in four pilaster strips attached to the gables.
- .8 Drawers:
 - .1 ¾" plywood, finish with plastic laminate. All four edges shall have plastic laminate edging. Fronts will be secured to drawer bodies with five screw nails through the front of the drawer body into the core of the drawer front.
 - .2 Drawer box including front, back and sides shall consist of box construction, carefully fitted glued and tenoned joints.
 - .3 Drawer bottom to be ¼" plywood, plastic laminate finished, dadoed and glued into box members.

- .9 Casework doors: 3/4" plywood, plastic laminate finished with plastic laminate to all four sides. Locks to be provided as indicated on details.
- .10 All cabinet frames whether for base, wall or tall floor standing cases, shall be fabricated so each is a self-contained module. Front side top and bottom, exterior and interior surfaces shall be finished allowing future relocation of any module, into any bench arrangement, without need of any additional finishing.
- .11 Rails shall be fabricated and machined to join the gables and form a rigid cabinet frame.
- .12 Tops (applied to wall and tall units only) shall be fabricated utilizing the same material and edge finish as gables.
- .13 Toe kick rail (behind rubber or ceramic base, as applicable) shall have a 4" x 3/4" section, waterproof fir plywood, machined to receive four screw nails for attachment to bottom front edge of gables. Cabinet base shall be plywood attached to cabinet separately, insuring the plastic laminate plywood gables do not come in contact with the floor.

2.6 SHOP FABRICATION

- .1 Shop install cabinet hardware.
- .2 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
- .3 Shop assemble work for delivery to site in size easily handled and to insure passage through building openings.

2.7 PLASTIC LAMINATED TOPS

- .1 Coordinate with Section 06 47 00.
- .2 19 mm thick particle board core with post-forming grade plastic laminate finish bonded with resorginal formaldehyde resin glue to a particleboard core. All countertop front face to return vertically 35 mm ± . All front and backsplash edges to be rounded.
- .3 Underside to receive a backing sheet, sanded one side and bonded same as surfacing material.
- .4 Exposed edges to be finished with same material as used for the top.
- .5 Drip grooves to be cut into underside of the top where exposed edges occur.
- .6 Splash backs, curbs and curb shelves are to be of similar construction as the tops.
- .7 Use acid resistant post-forming grade laminate, where indicated on drawings. Colour: black.
- .8 At all wall termination, provide backsplash return.

2.8 MOULDING AND TRIMS

- .1 Fabricate mouldings in maximum practical lengths to profile shown. Install with concealed fasteners.
- .2 Note requirement for this Section to supply and install solid maple or birch wood trim with clear satin trim where noted on drawings or AD drawings in Binder C.

2.9 FABRICATION

- .1 Set nails and countersink screws apply wood filler to indentations, sand smooth and leave ready to receive finish.
- .2 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.
- .3 Shelving to cabinetwork to be adjustable unless otherwise noted.
- .4 Provide cut-outs for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
- .5 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.
- .6 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.
- .7 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .8 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.
- .9 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.
- .10 Apply laminate backing sheet to reverse side of core of plastic laminate work.
- .11 Apply laminated plastic liner sheet where indicated.

2.10 SCIENCE CLASS UPPER CABINETS

- .1 6 mm tempered Glazing to upper cabinet units in science classroom to be provided to Millworker by Section 08 80 50.

2.11 DISPLAY CASES

- .1 Display Cases: Provide and install appropriate hinges, keyed locks and wood/glass shelf supports required for all display cases as described on drawings. Glazing to be provided by section 08 80 50. Refer to Section 08 80 50.
- .2 Display/Trophy Case Finish:
 - .1 Linseed oil, Forbo Tackboard surfacing to interior of all display cabinets where felt or tackboard is indicated: supplied by Architectural School Products or equivalent product by other manufacturer approved by the Consultant. Colour to be selected by Architect.

2.12 INSTALLATION

- .1 Do architectural woodwork to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.
- .2 Install prefinished millwork at locations shown on drawings. Position accurately, level, plumb straight.
- .3 Set and secure all material and components in place, rigid, plumb and square.
- .4 Provide heavy duty fixture attachments for wall mounted cabinets.
- .5 Use draw bolts in countertop joints.
- .6 At junction of plastic laminate counter back splash and adjacent wall finish, apply small bead of sealant.
- .7 Apply water resistant building paper over wood framing members in contact with masonry or cementitious construction.
- .8 After installation, fit and adjust operating hardware for wood and laminated plastic cabinet doors, drawers and shelves.

2.13 CLEANING

- .1 Clean millwork, cabinet work, drawers and outside surfaces.
- .2 Remove excess glue from surfaces.

2.14 PROTECTION

- .1 Protect millwork and cabinet work from damage until final inspection.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 08 12 10 Flush Wood Doors

1.2 REFERENCES

- .1 CAN/CGSB-71.20-M88 Adhesive, Contact, Brushable
- .2 CAN3-A172-M79 High Pressure Paper Base, Decorative Laminates.
- .3 CSA O112 Series-M1977(R2001) CSA Standards For Wood Adhesives.
- .4 CSA O121-M1978(R2003) Douglas Fir Plywood.
- .5 CSA O151-04 Canadian Softwood Plywood.

1.3 SAMPLES

- .1 Submit duplicate samples of joints, edging, cutouts and postformed profiles in accordance with the General Conditions.

1.4 MAINTENANCE DATA

- .1 Provide maintenance data for laminated plastics work for incorporation into Operation and Maintenance Manual.

1.5 PRODUCT HANDLING

- .1 Cover finished laminated plastic surfaces with heavy kraft paper or put in cartons during shipment. Protect installed laminated surfaces by approved means. Do not remove until immediately before final inspection.
- .2 Do not store or install materials in areas where relative humidity is less than 25% or greater than 60% at 22 deg C.

Part 2 Products

2.1 GENERAL

- .1 Products manufactured by one of the following companies are suggested for use on this project.
 - .1 Cyanamid Canada Inc., Montreal (Formica).
 - .2 Domtar Construction Materials, Arborite Division, LaSalle Quebec (Arborite).
 - .3 Wilsonart International, Temple, Texas (Wilsonart).
 - .4 Nevamar Corporation, Odenton Md.

- .2 Allow for 6 colours of matte finish from manufacturer's full range. Final Selection of Plastic Laminate surface characteristics including colour, texture and pattern is to be made by the Consultant by means of a Colour Schedule to be issued at a later date. Use the following materials specifications as a base bid:

2.2 MATERIALS

- .2 Laminated plastic for flatwork: to CAN3-A172, Grade GP, Type SD, 1.25mm (0.050") thick; based on full colour range with velour finish. Acceptable products:
- .1 Formica Laminate Grade 10.
 - .2 Nevamar H-5 General Purpose Grade.
 - .3 Wilsonart General Purpose HGS Type 107.
- .3 Laminated plastic for postforming work: to CAN3-A172, Grade PF, Type S, 1.07mm (0.042") thick, based on full colour range with velour finish. Acceptable products:
- .1 Formica Laminate Grade 12.
 - .2 Nevamar HF-5 Horizontal Post Forming Grade.
 - .3 Wilsonart Postforming Type 350.
- .4 Laminated plastic backing sheet: supplied by same manufacturer as facing sheet; not less than 0.508 mm (0.02") thick and same colour as face laminate. Sanded one side. Acceptable products:
- .1 Formica Laminate Grade 20.
- .5 Laminated plastic cabinet liner sheet material or for MCP Board or Cladboard material: supplied by same manufacturer as facing sheet, not less than 0.760 mm (0.028") thick, white colour. Acceptable products:
- .1 Formica Laminate Grade 20.
 - .2 VF-3 Vertical Post Forming Grade by Nevamar.
 - .3 Wilsonart Vertical Surface Type 335.
- .6 Plywood core: Douglas Fir Plywood to CSA-O121 or Canadian Softwood Plywood to CSA-O151 solid two sides, 19 mm (¾") thick.
- .7 Particleboard core: to CAN3-O188.1, Grade R, sanded faces, of thickness indicated.
- .8 Adhesive for laminated plastic: to be CSA approved and one of the following types as selected by the laminate manufacturer as being suitable for the application:
- .1 Urea resin adhesive to CSA O112 Series.
 - .2 Contact adhesive to CAN/CGSB-71.20.
 - .3 Resorcinol resin adhesive to CSA O112.
 - .4 Polyvinyl adhesive to CSA O112.

- .5 Two component epoxy thermosetting adhesive.
- .9 Sealer: water resistant sealer or glue acceptable to laminate manufacturer.
- .10 Sealant: of a type recommended by the laminate manufacturer and in accordance with Section 079210 - Joint Sealers; colour to be selected by the Consultant.
- .11 Draw bolts and splines: as recommended by fabricator.
- .12 Apply laminate backing sheet to reverse side of core of plastic laminate work.
- .13 Apply laminated plastic liner sheet to interior of cabinetry, including all exposed surfaces such as gable ends, doors and drawers, and where otherwise indicated.

Part 3 Execution

3.1 INSTALLATION

- .1 Install work plumb, true and square, neatly scribed to adjoining surfaces.
- .2 Make allowances around perimeter where fixed objects pass through or project into laminated plastic work to permit normal movement without restriction.
- .3 Use draw bolts and splines in countertop joints. Maximum spacing 450 mm (18") oc, 75 mm (3") from edge. Make flush hairline joints.
- .4 Provide cutouts for inserts, grilles, appliances, outlet boxes and other penetrations. Round internal corners, chamfer edges and seal exposed core.
- .5 At junction of laminated plastic counter back splash and adjacent wall finish, apply small bead of sealant.
- .6 Where laminated plastic is site applied, adhere laminated plastic over entire surface. Make corners with hairline joints. Use full sized laminate sheets. Make joints only where indicated or approved. Slightly bevel arises. Cap exposed edges with anodized aluminum extrusions.
- .7 For site application, offset joints in plastic laminate facing from joints in core.

END OF SECTION

Ascension CES
5205 NEW ST., BURLINGTON, ON
Project #24-1323



PREPARED FOR:

HOSSACK AND ASSOCIATES ARCHITECTS



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**SECTION: Roof Areas 1, 2, 3, 4, 5, 6,
7, 8 & 9**

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07 11 00 – Roofing Scope of Work

PART 1 GENERAL

1.1 GENERAL CONDITIONS

- 1.1.1 Conform to all sections in this document and to the requirements of the Canadian Roofing Contractors Association Roofing Manual Specifications as referred to herein.
- 1.1.2 Abide by all Federal, Provincial, Municipal and Local Laws or Codes, rules and regulations that in any way affect work including all amendments up to the project date. No plea of misunderstanding will be considered on account of ignorance thereof. Notify the Consultant immediately in writing of any provisions in drawings, specifications or Contract, which are contrary to or inconsistent with any law, rule or regulation.
- 1.1.3 Where documents differ, the most stringent interpretation will apply.

1.2 TYPE OF FACILITY

- 1.2.1 This Contract will be carried out on the premises of an institutional facility/building.
- 1.2.2 Exercise appropriate care and keep construction noise and disruption to an absolute minimum and to the satisfaction of the Owner.
- 1.2.3 Take special precautions where alterations are required above and, in all areas, occupied by staff, or pedestrians.

PART 2 ROOF REPLACEMENT

2.1 DEMOLITION PHASE

- 2.1.1 Remove and dispose of all the following existing components and assemblies within the Scope of Work, including but not limited to:
 - .1 Sheet metal flashings, roof membranes and flashings, roofing overlay, insulation, vapour retarder, vents, roof drains, and all other accessories to the level of the existing asphaltic vapour barrier.
 - .2 As directed by the Owner's Representative, remove, and dispose all marked pieces of redundant equipment.

2.2 RECONSTRUCTION PHASE

- 2.2.1 As directed by the owner's representative:
 - .1 All deteriorated metal deck shall be replaced or repaired.
 - .2 All deteriorated wood components shall be replaced or repaired.
 - .3 Existing substrates shall be cleaned and prepared for application of new roofing components.

2.3 EXISTING ASSEMBLIES

- 2.3.1 It is the Contractor's choice to cut and confirm the remaining roof assemblies. No additional costs will be accepted or approved for/or by the Owner. The known existing roofing assemblies are:
 - .1 Roof Areas 1, 2, 3, 4, 5, 6 & 7:
 - (a) 2-Ply modified bituminous roof membranes (base and cap)
 - (b) 13mm (0.5") Overlay board
 - (c) 89mm (3.5") Fibreglass insulation

- (d) Asphaltic vapour barrier
- (e) 13mm (0.5") Gypsum subdeck
- (f) Concrete deck

.2 Roof Areas 8 & 9:

- (a) 2-Ply modified bituminous roof membranes (base and cap)
- (b) 13mm (0.5") Overlay board
- (c) 51mm (2.0") Polyisocyanurate insulation
- (d) Asphaltic vapour barrier
- (e) 13mm (0.5") Gypsum subdeck
- (f) Metal deck

2.4 NEW ROOF ASSEMBLIES:

2.4.1 Roof Areas 1, 2, 3, 4, 5, 6 & 7:

- .1 Supply and install the new roofing system comprised of the following (from the top down):
 - (a) 1-Ply of modified bituminous granulated cap sheet torched in place
 - (b) 1-Ply of modified bituminous base sheet in Type II asphalt
 - (c) 13mm (0.5") fibreboard overlay in Type II asphalt
 - (d) 1% Tapered insulation in Type II asphalt, as designed
 - (e) 64mm (2.5") Polyisocyanurate insulation in Type II asphalt
 - (f) 64mm (2.5") Polyisocyanurate insulation in Type II asphalt
 - (g) 1-Ply of base sheet vapour barrier in type II asphalt
 - (h) Asphaltic vapour barrier (existing)
 - (i) 13mm (0.5") Gypsum subdeck (existing)
 - (j) Concrete deck (existing)
 - (k) All membrane flashings are to be 1-ply modified bituminous membrane (base sheet) mopped in place with Type III asphalt and 1-ply granulated modified bituminous membrane (cap sheet) torched in place.
 - (l) Conform to Section 07 52 16 – Styrene-Butadiene-Styrene Modified Bituminous Membrane Roofing.

2.4.2 Roof Areas 8 & 9:

- .1 Supply and install the new roofing system comprised of the following (from the top down):
 - (a) 1-Ply of modified bituminous granulated cap sheet torched in place
 - (b) 1-Ply of modified bituminous base sheet in Type II asphalt
 - (c) 13mm (0.5") fibreboard overlay in Type II asphalt
 - (d) Tapered backslope insulation in Type II asphalt, as designed (Roof 8 only)
 - (e) 51mm (2.0") Polyisocyanurate insulation in Type II asphalt
 - (f) 1-Ply of base sheet vapour barrier in type II asphalt

- (g) Asphaltic vapour barrier (existing)
- (h) 13mm (0.5") Gypsum subdeck (existing)
- (i) Metal deck (existing)
- (j) All membrane flashings are to be 1-ply modified bituminous membrane (base sheet) mopped in place with Type III asphalt and 1-ply granulated modified bituminous membrane (cap sheet) torched in place.
- (k) Conform to Section 07 52 16 - Styrene-Butadiene-Styrene Modified Bituminous Membrane Roofing.

2.5 ADDITIONAL REQUIREMENTS

- 2.5.1 Remove and dispose of the existing roofing components that are not required to remain as part of the new roofing system.
- 2.5.2 All areas within the designated work area with exposed deck, such as gyms and libraries as well as all areas with electronics are to be protected for the duration of the re-roofing project. The contractor is responsible for assessing the entire interior space impacted by the roof project and provide the consultants and owner with a written report outlining the interior protection plan that is implemented. The contractor to include references to each space within the roof area being replaced and include photographs of the protection in place prior to commencing demolition/removals. The contractor will be responsible for all costs associated with all repairs and replacements of all interior spaces related to damage as a result of the roof replacement project. This includes building components and building contents.
- 2.5.3 All electrical lines, satellite wires etc. are to be run through gooseneck style projections. If electrical lines are too short, extensions will need to be installed. Re-route all improperly run wires.
- 2.5.4 All mechanical and electrical work is the responsibility of the Contractor and included within the base bid. Contractor is free to utilize mechanical/electrical contractor of choice.
- 2.5.5 The electrical lighting mounted on the perimeters are the responsibility of the Owner and shall be disconnected prior to commencing the replacement.
- 2.5.6 Supply and install new self-adhered membranes and metal flashings with "x" breaks on the exterior perimeter (above windows) prior to installing metal cap flashings.
- 2.5.7 Raise perimeter wood blocking to accommodate the new roof height.
- 2.5.8 Supply and install the new roofing components in accordance with the Contract Documents.
- 2.5.9 The Contractor will provide the Owner and the Consultant with as-built drawings upon close-out of the project.
- 2.5.10 Utilize same manufacturer/supplier of membrane and related primary materials.
- 2.5.11 Provide the membrane manufacturer's warranty as specified.
- 2.5.12 Dispose of all debris/waste in approved containers and transfer to an approved municipal and/or provincial disposal site(s).

END OF SECTION 07 11 00

07 14 00 – Roofing Work Restrictions

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- 1.1.1 The Scope of Work shall be as outlined in the attached Specification. It is intended that the Work so described is complete in that typographical errors or omissions will not impart a partial or incomplete aspect to the Work. Any such situation must be brought to the immediate attention of the Owner prior to the close of Tender.
- 1.1.2 The Work listed herein shall constitute the furnishings and installation of all roofing materials, insulation, fasteners, metal Work, and other materials deemed to be a part of the overall system as specified in the accompanying Drawings, Documents, and Specifications.
- 1.1.3 The Contractor shall provide all superintendence, labour, equipment, and materials necessary to the orderly, competent, and expeditious completion of the Work. While Work is in progress, the Contractor must maintain site superintendent capable of acting competently on-site instructions given by the Owner or his duly appointed representative. A copy of all Specifications, Drawings, written instructions, and changes in the Work shall be kept on site by the Contractor and shall be available for reference as required.

1.2 SPECIFICATION OF TEXT

- 1.2.1 In case of any error, inconsistency, or omission in the Drawings or Specifications, the Consultant must be contacted immediately.
- 1.2.2 It is understood and agreed by the Contractor that the Work herein described and/or shown on the Drawings and Details shall be complete in every Detail even though items necessarily involved are not particularly mentioned. The Contractor shall be held to provide all labour and materials necessary for the completion of the Work intended to be so described and/or shown
- 1.2.3 Should the Drawings and/or Specifications disagree as to the quantity or quality of the Work required, the greater quantity or better quality shall be provided unless contrary instructions are issued by the Consultant in writing.
- 1.2.4 Application of materials or installation of equipment shall be done in strict accordance with the respective Manufacturers' Specifications and/or field instructions.
- 1.2.5 Any Details or procedures not covered by these Specifications will be performed in accordance with the recommended procedures outlined in the latest publication of the CRCA Roofing Manual.
- 1.2.6 For the purpose of this Specification, the terms Owner's Representative, Roof Observer, Inspection Company, and Consultant shall mean Consultant, represented by Tri-Tech Pinnacle Group Inc.

1.3 01 14 13 ACCESS TO SITE

- 1.3.1 Provide and maintain adequate access to the project site.
- 1.3.2 Design, construct and maintain temporary "access to" and "egress from" Work areas, including stairs, runways, ramps, ladders and/or scaffolding, independent of finished surfaces and in accordance with the relevant municipal, provincial and other regulations.
- 1.3.3 Coordinate access to the interior of the building with the Owner's representative.
- 1.3.4 Allow inspection/testing agencies access to the Work, off site manufacturing and fabrication plants.
- 1.3.5 Co-operate to provide reasonable facilities for such access.

1.4 01 14 16 COORDINATION WITH OCCUPANTS

1.4.1 ALTERATIONS, ADDITIONS OR REPAIRS TO THE EXISTING BUILDING

- .1 Execute the Work with the least possible interference or disturbance to the building operations, occupants and public and normal use of the premises. Arrange with the Owner's Representative to facilitate the execution of the Work.

1.4.2 EXISTING SERVICES

- .1 Notify the Owner's Representative and the utility companies of any intended interruption of services and obtain the required permission.
- .2 Maintain existing services to the building and provide for personnel and vehicle access.
- .3 Where Work involves breaking into or connecting to existing services, give the Owner's Representative (Forty-eight) 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of the Work. Keep the duration of interruptions minimal. Carry out interruptions after normal working hours of occupants, preferably on weekends.
- .4 Construct barriers in accordance with Section 01 50 00, Part 5 Temporary Barriers and Enclosures

1.5 SPECIAL REQUIREMENTS

- 1.5.1 Ensure the Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- 1.5.2 Keep within limits of Work and avenues of ingress and egress.

1.6 SECURITY

- 1.6.1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.

1.7 01 14 19 USE OF SITE

- 1.7.1 The Contractor and his/her employees shall adhere to all regulations set forth by the Ministry of Labour.
- 1.7.2 The Contractor and his/her employees shall adhere to all the rules and regulations of the facility.
- 1.7.3 The Contractor's employees will be limited to the Work area. Cleanliness is critical in this building.
- 1.7.4 The Contractor's vehicles must observe facility speed limits and stay on hard surface roads. Permission to drive on lawns and/or landscaped areas or to enter restricted areas must be secured from the Owner.
- 1.7.5 The Contractor will not use the Owner's equipment or tools unless specifically permitted to do so by the Owner. The Contractor will be responsible for any equipment or tools he is permitted to borrow.
- 1.7.6 WORK AREA - The Contractor shall confine his equipment, storage of materials, and operations of his Workmen to limits indicated by laws, ordinances, permits, or prior arrangements with the Owner. The Contractor shall not unreasonably encumber the premises with his apparatus and shall leave said premises in its original condition upon completion of the Work. All debris created by the execution of the Work shall be considered to be the Contractor's property and removed progressively from the site to the appropriate disposal grounds.
- 1.7.7 PROTECTION - In areas where hot asphalt and/or materials will be raised to, or lowered

from the roof, a protective covering shall be placed from the base of the wall extending up and over the top edge of the roof. This covering shall be wide enough to ensure that the exterior walls do not become stained or soiled during roofing operations.

- 1.7.8 CLEANING - All splatters of bitumen shall be removed from ladders, flashings, walls, all finished surfaces, etc. Workers will wear only street shoes in the building. Any and all dirt or damage will be cleaned, repaired, or replaced to the satisfaction of the Consultant.
- 1.7.9 BARRIERS AND SIGNS - The Contractor shall place necessary barriers and warning signs around and/or under all Work areas where his operations may endanger pedestrians or create a dangerous situation.
- 1.7.10 Designated existing elevators are to be used by construction personnel and the transporting of materials only. Co-ordinate use with the Owner's Representative.
 - .1 Provide protective coverings for finish surfaces of cars and entrances.
 - .2 Accept liability for damage, safety of equipment and overloading of the existing equipment.
- 1.7.11 Protect all Work temporarily until permanent closures are completed.
- 1.7.12 Comply with all smoking restrictions. Smoking is not permitted on site.

END OF SECTION 07 14 00

07 50 00 – Roofing Temporary Facilities & Controls

PART 1 01 51 00 TEMPORARY UTILITIES

1.1 GENERAL

- 1.1.1 The Owner shall, where possible, provide existing electricity, lighting, and water necessary for construction purposes. When this is not possible, the Contractor shall provide the same at no additional cost to the Owner. The Contractor must obtain permission from the property manager to use electricity. The Owner will designate exactly which outlets are available to the Contractor. The Owner will allow 120-volt usage from designated outlets, 220-volt service will not be supplied.
- 1.1.2 The Contractor will undertake all necessary connections and maintain such connections in good order.
- 1.1.3 The Contractor will remove all interconnections and make good the original system when such services are no longer required.

1.2 01 51 13 TEMPORARY ELECTRICITY

- 1.2.1 Use the existing electrical service in relation to the Work.
- 1.2.2 The Owner is to pay all electrical consumption charges incurred for the duration of the Contract.

1.3 01 51 16 TEMPORARY FIRE PROTECTION

- 1.3.1 Abide by the Provincial and/or National Fire Protection/prevention codes and standards, Provincial Occupational Health and Safety Regulations, and regulations for the construction projects.
- 1.3.2 Ensure that all employees are fully aware of the procedures to be followed in the event of fire, and that they are fully trained in operating fire-extinguishing equipment. During Working hours, check operations of Workers to ensure appliances, extension lights, flammable liquids, etc. are used safely and take such corrective measures as necessary.
- 1.3.3 Ensure that the supervisor and the fire safety representative are fully familiar with WHMIS and MSDS sheets relating to all materials on site and to the fire safety recommendations of the Manufacturer, applicable provincial Contractor's Association and local authorities. Copies are to be kept on site for reference.
- 1.3.4 Smoking is not permitted on site.
- 1.3.5 Act as the Fire Warden and maintain fire protection and enforce proper fire protection practices.
- 1.3.6 Never apply open flame directly to old or dry wood surfaces.
- 1.3.7 Torches are never to be placed near combustible or flammable products.
- 1.3.8 Comply with the requirements of the standard for Building Construction Operations FCC #301-June 1982, issued by the Fire Commissioner of Canada and all subsequent Amendments.
- 1.3.9 KETTLES
 - .1 Locate roofing kettles in a safe location a minimum of 3 metres (ten (10) feet away from any Walls. **Under no circumstances is a kettle to be operational and used from the rooftop.**
 - .2 Roofing kettles are to be continuously supervised to ensure that the bitumen is not overheated. Temperature is to be checked with an accurate thermometer that is not attached to the kettle. This thermometer must be made available to the inspector on

demand. Apply roofing asphalt at + or - 15 degrees C. of the indicated EVT stated on the asphalt kegs or Bill of Lading for tanker asphalt.

- .3 Any bitumen that is found to have exceeded the recommended EVT must be disposed of away from the site.
- .4 The kettle person shall wear all required protective equipment. All propane bottles shall be maintained in an upright position. Two fully charged fire extinguishers shall be maintained near the kettle.
- .5 When two (2) different types of asphalt are specified, two (2) separate kettles will be required on site. Mixing of different asphalt types will not be tolerated.

1.3.10 REPORTING FIRES

- .1 Know the location of the nearest fire alarm box and telephone, including emergency phone number, and make available to all employees.
- .2 Immediately report any fire incidents to the Fire Department as follows:
- .3 Activate the nearest fire alarm box; or
- .4 Telephone.
- .5 The person activating the fire alarm box will remain at the box to direct the Fire Department to the scene of the fire.
- .6 When reporting a fire by telephone, give the location of the fire, the name or number of the building and be prepared to verify the location.

1.3.11 INTERIOR AND EXTERIOR FIRE PROTECTION AND ALARM SYSTEMS

- .1 Fire protection and alarm system will not be:
- .2 Obstructed.
- .3 Shut-off.
- .4 Left inactive at the end of the Working day or shift without authorization from the Fire Chief.
- .5 Fire hydrants, standpipes and hose systems will not be used for anything other than fire-fighting purposes unless authorized by the Fire Chief.

1.3.12 FIRE WATCH

- .1 A fire watch on the kettle must be maintained at all times. The kettle operator's duties will involve Work exclusively at the kettle location to maintain a constant fire watch. It is the responsibility of the fire watch to maintain proper operating temperatures and conditions around the kettle. There will be at least two (2) serviceable, full sized extinguishers located at each kettle location.
- .2 Maintain a fire watch for a minimum of two (2) hours after the stop of the torch operation within roof areas of Work for each Work period. Log a record of the fire watch within the Contractor's logbook to be forwarded to the Owner upon leaving the site on a daily basis.

1.3.13 FIRE EXTINGUISHERS

- .1 Fire extinguishers shall be present on the job site at all times. All extinguishers should be checked no less than once each month and serviced by qualified personnel on a yearly basis. There shall be one fire extinguisher present for each torch unit being used on the Project. Said extinguisher will be located within 8 metres (twenty-five (25) feet) of the area where the torch is being used.
- .2 Supply fire extinguishers, as scaled by the Fire Chief, necessary to protect Work in

progress and the Contractor's physical plant on site.

- .3 Provide at least three (3) Class ABC Working fire extinguishers throughout the duration of Project. Keep one of these at the location of the kettles at all times and at least one 20 lb. fire extinguisher within 3.05 Metres (10') of all operating torches.
- .4 Replace all empty or partially discharged fire extinguishers immediately after use and remove used extinguishers from the site.

1.3.14 RUBBISH AND WASTE MATERIALS

- .1 Keep rubbish and waste materials at minimum quantities.
- .2 Burning of rubbish is prohibited.
- .3 Removal:
- .4 Remove rubbish from the Work site at the end of the Workday or shift or as directed.
- .5 Storage:
 - (a) Store oily waste in approved receptacles to ensure maximum cleanliness and safety.
- .6 Deposit greasy or oily rags and materials subject to spontaneous combustion in approved receptacles and remove as specified.
- .7 All used mops are to be spread open and cooled before leaving the roof to avoid fire potential.

1.3.15 FLAMMABLE AND COMBUSTIBLE LIQUIDS

- .1 Handling, storage and use of flammable and combustible liquids is governed by the current National Fire Code of Canada.
- .2 Keep flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use in quantities not exceeding 45 litres provided they are stored in approved safety cans bearing Underwriters' Laboratory of Canada or Factory Mutual Seal of approval. Storage of quantities of flammable and combustible liquids exceeding 45 litres for Work purposes requires permission of the Fire Chief.
- .3 The transfer of flammable and combustible liquids is prohibited within buildings or jetties.
- .4 The transfer of flammable and combustible liquids will not be carried out in the vicinity of open flames or any type of heat-producing devices.
- .5 Do not use flammable liquids having a flash point below 38 degrees C such as naphtha or gasoline as solvents or cleaning agents.
- .6 Store flammable and combustible waste liquids, for disposal, in approved containers located in a safe ventilated area. Keep quantities to a minimum and the Fire Department is to be notified when disposal is required.

1.3.16 HAZARDOUS SUBSTANCES

- .1 Work entailing the use of toxic or hazardous materials, chemicals and/or explosives, or otherwise creating hazard to life, safety or health is in accordance with National Fire Code of Canada.
- .2 Obtain from the Fire Chief, a "Hot Work" permit for Work involving welding, burning or the use of blowtorches and salamanders, in buildings or facilities.
- .3 When Work is carried out in dangerous or hazardous areas involving use of heat, provide fire watchers equipped with sufficient fire extinguishers. Determination of dangerous or hazardous areas along with the level of protection necessary for the Fire

Watch is at the discretion of the Fire Chief. Contractors are responsible for providing fire watch service for Work on the scale established and in conjunction with the Fire Chief at pre-Work conference.

- .4 Provide ventilation where flammable liquids, such as lacquers or urethanes are used, eliminate sources of ignition. Inform the Fire Chief prior to and at the cessation of such Work.

1.3.17 QUESTIONS AND/OR CLARIFICATION

- .1 Direct questions or clarification on Fire Safety in addition to the above requirements to the Fire Chief.

1.3.18 FIRE INSPECTION

- .1 Co-ordinate site inspections by the Fire Chief through the Departmental Representative.
- .2 Allow the Fire Chief unrestricted access to the Work site.
- .3 Co-operate with the Fire Chief during routine fire safety inspection of the Work site.
- .4 Immediately remedy any unsafe fire situations observed by the Fire Chief.

PART 2 01 52 00 CONSTRUCTION FACILITIES

2.1 01 52 13 FIELD OFFICES AND SHEDS

- 2.1.1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- 2.1.2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause the least interference with Work activities.

2.2 01 52 19 SANITARY FACILITIES

- 2.2.1 The Contractor shall provide the toilet facilities for his employees as required. The Contractor's personnel are not permitted to enter the building without proper authorization from the Owner.
- 2.2.2 Post notices and take precautions as required by the local health authorities. Keep the area and the premises in a sanitary condition.
- 2.2.3 The location is as directed by the Owner/Consultant.

PART 3 01 54 00 CONSTRUCTION AIDS

3.1 01 54 16 TEMPORARY HOISTS AND CRANES

- 3.1.1 Provide, operate, and maintain hoists and/or cranes required for the moving of Workers, materials and equipment. Make financial arrangements with Sub-Contractors for their use of hoists.
- 3.1.2 Hoists and/or cranes are to be operated by a qualified operator.

3.2 01 54 23 TEMPORARY SCAFFOLDING AND PLATFORMS

- 3.2.1 Erect and maintain scaffolding and platforms in accordance with CAN/CSA-S269.2.
- 3.2.2 Provide temporary controls in order to execute the Work expeditiously.
- 3.2.3 The location of scaffolding is to be approved by the Owner or the Consultant prior to its erection.
- 3.2.4 Construct and maintain all scaffolding in a rigid, secure and safe manner.
- 3.2.5 Erect scaffolding independent of any walls.

3.2.6 Remove promptly when no longer required.

PART 4 01 55 00 VEHICULAR ACCESS AND PARKING

4.1 01 55 13 TEMPORARY ACCESS ROADS

- 4.1.1 Provide and maintain access to all roads, sidewalk crossings, ramps and construction runways as may be required for access to the Work.
- 4.1.2 Maintain access to the property, including overhead clearances for use by emergency response vehicles.
- 4.1.3 Do not close or obstruct walkways, passageways, or stairways without the Owner's and/or Consultant's authorization. Do not store or place materials in passageways, stairs, or other means of egress. Conduct operations with minimum traffic interference.

4.2 01 55 16 HAUL ROUTES

- 4.2.1 The Contractor's traffic on roads, selected for hauling the material to and from the site, are to interfere as little as possible with public traffic.

4.3 01 55 19 TEMPORARY PARKING AREAS

- 4.3.1 Parking will be subject to the Owner's approval and instructions.
- 4.3.2 Temporary parking space for the delivery of materials will be made available by the Owner.

4.4 01 55 26 TRAFFIC CONTROL

- 4.4.1 Protect the travelling public from damage to person and property.

PART 5 01 56 00 TEMPORARY BARRIERS AND ENCLOSURES

5.1 01 56 16 TEMPORARY DUST BARRIERS

- 5.1.1 As required, install temporary debris barriers to ensure containment of loose, wind-blown debris.

5.2 01 56 23 TEMPORARY BARRICADES

5.2.1 GUARD RAILS AND BARRICADES

- .1 Provide as temporary guard rails and barricades required by governing authorities.
- .2 Provide, erect, and maintain catch platforms, lights, barriers, weather protection, warning signs, and other items as required for proper protection of Workers engaged in renovation operations, building occupants, and members of the public and adjacent construction.

5.2.2 HOARDING

- .1 Erect temporary site enclosures using 38mm x 89mm [2x4] construction grade lumber framing at 609.635mm [24"] centres and 1219.2mm x 2438.4mm x 12.7mm [48" x 96" x ½"] exterior grade fir plywood to CSA O121.
- .2 Apply plywood panels vertically flush and butt jointed.
- .3 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

5.3 01 56 26 TEMPORARY FENCING

- 5.3.1 Provide an "Insta-Fence" type fence system and lockable barriers around all ground operations.

5.4 01 56 36 TEMPORARY SECURITY ENCLOSURES

- 5.4.1 To avoid vandalism and/or theft, remove or store and secure all tools and equipment at the end of each day's Work.

PART 6 01 57 00 TEMPORARY CONTROLS

6.1 01 57 26 SITE WATERING FOR DUST CONTROL

- 6.1.1 Take necessary precautions to prevent dust and dirt from rising by wetting demolished masonry, concrete, plaster, and similar debris. Protect unaltered portions of the existing building affected by the operation under this section using dustproof partitions and other adequate means.

PART 7 01 58 00 PROJECT IDENTIFICATION

7.1 01 58 13 TEMPORARY PROJECT SIGNAGE

- 7.1.1 No signs or advertising is permitted to be erected on the building or the site, without previous approval by the Consultant or the Owner.
- 7.1.2 All customary signs or posters relative to fire, traffic and pedestrian safety, danger and miscellaneous safety or those required by law, are to be prominently displayed at the required locations.

END OF SECTION 07 50 00

07 10 00 – Roofing Rough Carpentry

PART 1 GENERAL

1.1 GENERAL CONDITIONS

- 1.1.1 All conditions of the Contract and Divisions 00 and 01 apply to this section and to the requirements of the Canadian Roofing Contractors Association Roofing Manual Specifications as referred to herein.
- 1.1.2 Abide by all Federal, Provincial, Municipal and Local Laws or Codes, rules, and Regulations that in any way affect the Work, including all amendments up to the Project date.
- 1.1.3 All Standards, Regulations and Specifications listed herein are the latest edition.

1.2 CO-ORDINATION

- 1.2.1 Co-ordinate Work of this Section with Work of:
 - .1 Section 07 11 00 Roofing Scope of Work
 - .2 Section 07 52 16 Styrene-Butadiene-Styrene Modified Bituminous Membrane Roofing.
 - .3 Section 07 62 00 Sheet Metal Flashing and Trim.
 - .4 Section 07 92 00 Joint Sealants.

1.3 REFERENCE STANDARDS

- 1.3.1 Carpentry materials, products, and accessories shall be in accordance with the most current applicable industry standards including but not limited to:
 - .1 ASTM INTERNATIONAL
 - (a) ASTM A123/A123M Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - (b) ASTM A307, Carbon Steel Bolts & Studs.
 - (c) ASTM A653/A653M Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by Hot-Dip Process.
 - (d) ASTM-D1037 – Wood Based Fiber & Particle Panels (Hardboard, OSB)
 - (e) ASTM D1761 Mechanical Fasteners in Wood.
 - (f) ASTM D5456 Evaluation of Structural Composite Lumber Products.
 - (g) ASTM F1667, Nails, Spikes & Staples
 - .2 ANSI/ASME
 - (a) ANSI/ASME B18.6.1 – Wood Fasteners
 - (b) ANSI/ASME B18.6.3 – Steel Fasteners
 - .3 CSA INTERNATIONAL
 - (a) CAN/CSA Asphalt Coated Roofing Sheets
 - (b) CSA B111 - Wire Nails, Spikes and Staples.
 - (c) CSA 080 – Preservative Treatment of Timber by Pressure Process.
 - (d) CSA O112 Series - CSA Standards for Wood Adhesives.
 - (e) CSA O121 - Douglas Fir Plywood.
 - (f) CAN/CSA O122 - Structural Glued-Laminated Timber.

- (g) CSA 0141 - Softwood Lumber.
- (h) CSA 0151 - Canadian Softwood Plywood.
- (i) CSA 0153 - Poplar Plywood.
- (j) CSA 0325 - Construction Sheathing.
- (k) CSA 0437 Series - Standards on OSB and Waferboard.
- 4 FOREST STEWARDSHIP COUNCIL (FSC)
 - (a) FSC-STD-01-001 - FSC Principle and Criteria for Forest Stewardship.
 - (b) FSC-STD-20-002 - Structure and Content of Forest Stewardship Standards V2-1.
 - (c) FSC Accredited Certified Bodies.
- 5 NATIONAL LUMBER GRADES AUTHORITY (NLGA)
 - (a) Standard Grading Rules for Canadian Lumber.
- 6 UNDERWRITERS' LABORATORIES OF CANADA (ULC)
 - (a) CAN/ULC-S706 - Standard for Wood Fibre Insulating Boards for Buildings.

1.4 QUALITY ASSURANCE

- 1.4.1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- 1.4.2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ASTM standards.

PART 2 PRODUCTS

2.1 COMPATIBILITY

- 2.1.1 Compatibility between materials is an essential requirement of the Contract.

2.2 WOOD

2.2.1 BLOCKING AND ROUGH FRAMING

- .1 Grade No. 2, Northern Softwood in accordance with "Standard Grading Rules for Canadian Lumber" as issued by National Lumber Grades Authority (N.L.G.A.).
- .2 Spruce, #1 Softwood, conforming to CSA 0151.
- .3 Wood Cants: 89mm x 89mm (3.5" x 3.5", 2x4 nominal).
- .4 Wood Blocking: 38mm x 38mm (1.5" x 1.5", 2x2 nominal), 38mm x 89mm (1.5" x 3.5", 2x4 nominal), 38mm x 140mm (1.5" x 5.5", 2x6 nominal) 38 x 184mm (1.5" x 7.25", 2x8 nominal), 38mm x 254mm (1.5" x 9.25", 2x10 nominal)), 38mm x 286.35mm (1.5" x 11.25" (2x12 nominal).

2.2.2 PLYWOOD SHEATHING

- .1 Exterior, Spruce #1, conforming to CSA 0151 or 0121, exterior grade, G1S. Thickness of 12.7mm (1/2") and/or 19.05mm (3/4") as noted on the Drawings.

2.2.3 WOOD PRESERVATIVE

- .1 Copper or Zinc Naphthenate of 5% Pentachlorophenol solution, water repellent preservative to CSA Series 080, green or clear colour or approved alternate. If preservative is Ammonium Copper Quaternary (ACQ), then stainless steel 300 fasteners are to be used. FASTENERS

2.2.4 NAILS

- .1 Ardox spiral, to CSA Standard B111, length to give 25.4mm (1") minimum penetration into the materials being fastened.

2.2.5 SCREWS

- .1 Fasteners for wood: Galvanized steel wood screws with countersunk heads of size and length to provide a minimum 38mm (1.5") penetration into the underlying member.
- .2 Fasteners for steel substrates: Flat head, self-tapping steel screw with galvanized finish as supplied by Fastening House, or Approved Alternate. Length: to suit. Penetrate through the member a minimum of 19.05mm (3/4").
- .3 Fasteners for masonry and concrete substrates: Tapcon fasteners with "ClimaSeal" corrosion resistant finish, as manufactured by Buildex/Red Head, or Approved Alternate. Screw to be of sufficient length to penetrate into the substrate a minimum of 38mm (1.5").
- .4 Bolts, Washers and Nuts: to ASTM A307. Size as indicated on the Drawings. Hot dipped galvanized or an approved equivalent corrosion resistant finish.

PART 3 EXECUTION

3.1 GENERAL

- 3.1.1 All carpentry Work is to comply with the best practices of trade and by skilled carpenters.
- 3.1.2 Provide carpentry alterations and comply with best trade practices. Anchor all wood blocking securely to the existing surfaces and to each other.
- 3.1.3 Make adjustments to the specified procedures caused by weather and site conditions only with the Owner's approval.
- 3.1.4 Maintain all equipment in good Working order to ensure the control of roofing operations and the protection of the Work. Equipment and laying techniques are to meet the approval of the Consultant.

3.2 EXAMINATION

- 3.2.1 Ensure that existing wood blocking to be incorporated with the Work is in good condition and is permanently and properly secured to the existing surfaces.
- 3.2.2 Inform the Consultant of any unacceptable conditions immediately upon discovery.
- 3.2.3 Proceed with installation only after the unacceptable conditions have been remedied.
- 3.2.4 Replace all damaged material and re-seal masonry anchors as required to conform to the design intent herein described.
- 3.2.5 Remove all sharp edges that would otherwise damage materials that come in contact.

3.3 INSTALLATION

- 3.3.1 Cut, align, plumb, and secure the wood to conform to the full intent of the Details. Shim the new wood assembly where required in order to obtain true to line levels.
- 3.3.2 Construct continuous members from pieces of the longest practical length. Treat all saw cuts with wood preservative.
- 3.3.3 Countersink bolts where necessary to provide clearance for other Work.
- 3.3.4 Install spanning members with "crown-edge" up.
- 3.3.5 Install cant strips and blocking as indicated on the Drawings, secured permanently to the structure trimmed and levelled to accommodate chamfers and slopes. Install to

- accommodate insulation, roofing, and flashing materials.
- 3.3.6 Install continuous plywood sheathing, wood blockings, cants, studs, nailers and continuous shims where required and Detailed on the Drawings and Details. Shims are to be of sufficient height to ensure a minimum two (2%) percent positive slope on all parapet, perimeter, and dividing walls.
 - 3.3.7 Install the roof sheathing in accordance with the requirements of the NBC (National Building Code).
 - 3.3.8 Install furring and blocking as required to space-out and support facings, fascia, soffit, siding, and other work as required. All lumber is to be installed with butt joints offset 52mm (2"). Fasten at 457.2mm (18") o.c. using a 57mm (2-1/4") Ardox spiral nail.
 - 3.3.9 Install furring to support siding applied vertically where sheathing is not suitable for direct nailing.
 - 3.3.10 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
 - 3.3.11 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
 - 3.3.12 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.
 - 3.3.13 Fabricate sleepers, expansion joints, perimeters, and walls as detailed. Maintain a minimum height of 203mm (8") above the finished roof surface for sleepers and curbs and where permitted at walls.
 - 3.3.14 Securely the anchor wood blocking, cant strips, nailers and shims in place at 304.8mm (12") on centre in a staggered pattern. Fasten studs to the top and bottom plates with two screw fasteners. Fasten wood blocking, wood cant strips, nailers and shims to existing substrate with appropriate screw fasteners.
 - 3.3.15 Fasten the plywood along the supported edges at a minimum of 152.4mm (6") on centre. Fasten to the framing members within the field of the plywood panel at a maximum of 406.35mm (16") on centre. Fasten the plywood to the framing and the existing substrate with the appropriate fasteners.
 - 3.3.16 Re-fasten any loose existing wood blocking, cants, shims and plywood with screw fasteners where permitted to remain as part of the finished Work and to the satisfaction of the Consultant.
 - 3.3.17 Coordinate Work to keep cutting and remedial Work to a minimum. Fasteners are to be of size and spacing required to assure secure anchorage. Fastener spacing of the wood blocking to the substrate and to each other is not to exceed 304.8mm (12") o.c. unless otherwise accepted in writing by the Consultant.
 - 3.3.18 Construct wood blocking as per Details. Build-up all perimeter Details to accommodate the height of the new roof assembly where required. Install wood blocking so that the new wood blocking extends a minimum of 101.635mm (4") above the required finished roof surface. Install sloped wood blocking along the top of the perimeter sloping inward towards the roof. Build-up all unit curbs a minimum of 304.8mm (12") above the finished roof level to accommodate the height of the new roof assembly.
 - 3.3.19 Offset blocking layers 304.8mm (12") and weave corners.
 - 3.3.20 Assemble blocking using two staggered rows of nailing. Space nails in any row a maximum of 609.635mm (24") on centre. Within 2440mm (8') of outside corners, reduce maximum spacing to 304.8mm (12") on centre.
 - 3.3.21 Install asphalt protection board along the perimeters/curbs/walls, from the top of the existing deck to the top edge of the wood blocking along the perimeters/curbs/walls. The asphalt protection board is to be secured 152.4mm (6") on centre horizontally with

fasteners spaced no more than 304.8mm (12") on centre vertically.

3.4 MECHANICAL CURBS

- 3.4.1 All fans, HVAC, vents, skylight curbs etc. are to be box framed to a minimum height of 203mm (8") above the finished roof surface.
- 3.4.2 This includes all roof top openings except drains, electrical conduits, soil stacks, hot stacks and vent stacks.
- 3.4.3 38mm (1-1/2") thick lumber is to be used or as detailed. Widths as may be required to achieve design intent.
- 3.4.4 Disconnecting, extending, and reconnecting electrical services to fans, HVAC units etc. Is to be completed by a Mechanical Contractor.
- 3.4.5 Extending ductwork and vent pipes to new elevations, as required, is to be performed as part of this Contract.

3.5 GAS LINE SUPPORTS

- 3.5.1 Install new adjustable supports at each pipe elbow, threaded joint, and where the pipe changes in direction, as well as approximately every 6' as per the current TSSA guidelines for the distance of the gas line/conduit tray.
- 3.5.2 Repair damage to adjacent materials caused by rough carpentry installation.

3.6 PROTECTION

- 3.6.1 Protect the installed products and components from damage during construction.
- 3.6.2 Repair damage to adjacent materials caused by rough carpentry installation.

3.7 CLEANING

- 3.7.1 Remove all surplus materials and debris resulting from the foregoing work daily as the Work proceeds and upon completion.

END OF SECTION 07 10 00

07 52 16 - Styrene-Butadiene-Styrene Modified Bituminous Membrane Roofing

PART 1 GENERAL

1.1 GENERAL CONDITIONS

- 1.1.1 All conditions of Contract and Divisions 0 and 1 apply to this section and to requirements of Canadian Roofing Contractors Association Roofing Manual Specifications as referred to herein.
- 1.1.2 Abide by all Federal, Provincial, Municipal and Local Laws or Codes, rules and regulations that in any way affect work including all amendments up to project date.

1.2 SECTION INCLUDES

- 1.2.1 Roof Areas 1, 2, 3, 4, 5, 6, 7, 8 & 9:

1.3 CO-ORDINATION

- 1.3.1 Co-ordinate work of this Section with work of:
 - .1 Section 07 11 00 Roofing Scope of Work
 - .2 Section 07 10 00 Roofing Rough Carpentry.
 - .3 Section 07 62 00 Sheet Metal Flashing and Trim.
 - .4 Section 07 92 00 Joint Sealants.

1.4 STANDARDS

- 1.4.1 Roofing materials, products, and accessories shall be in accordance with the most current applicable industry standards including but not limited to:
 - .1 CAN/CSA O80 SERIES – Wood Preservation.
 - .2 ASTM C1177/C1177M-[06], Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 - .3 ASTM C1278/1278M. Fiber Reinforced Gypsum Panels.
 - .4 ASTM C1396/C1396M-[06a], Standard Specification for Gypsum Board.
 - .5 CSA A123.23: Single Compound, One-Component, Elastomeric, Chemical Curing.
 - .6 CSA A123.23: Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
 - .7 ASTM D41: Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
 - .8 CGSB 37-GP-64M: Mat Reinforcing, Fibrous Glass, for Membrane Waterproofing Systems and Built-up Roofing.
 - .9 ASTM C165 Measuring Compressive Properties of Thermal Insulations.
 - .10 ASTM D6164/D6164M: Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
 - .11 ASTM A653/A653M-10: Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process.
 - .12 ASTM E84-12: Surface Burning Characteristics of Building Materials
 - .13 UL 790: Fire Tests of Roof Coverings – Class “A” as listed in TGFUC.R19921, Soprema Canada
 - .14 UL 1256: Fire Test of Roof Deck Constructions.

1.5 SYSTEM DESCRIPTION

1.5.1 Roof Areas 1, 2, 3, 4, 5, 6 & 7:

- .1 Modified Bituminous Conventional Roofing System: 1-ply granulated modified bitumen membrane (cap sheet) torched in place, 1-ply modified bitumen membrane (base sheet) mopped in place over fibreboard overlay boards, mopped in place over 1% tapered insulation, mopped in place over two layers of polyisocyanurate insulation both layers mopped in place over self-adhering base sheet vapour barrier adhered over existing asphaltic vapour barrier and gypsum boards mopped in place over the existing concrete deck. Membrane flashing to be 2-ply modified bitumen membranes, 1-ply modified bitumen membrane (base sheet) mopped in Type III asphalt and 1-ply granulated modified bitumen membrane (cap sheet) torched in place.

1.5.2 Roof Areas 8 & 9:

- .1 Modified Bituminous Conventional Roofing System: 1-ply granulated modified bitumen membrane (cap sheet) torched in place, 1-ply modified bitumen membrane (base sheet) mopped in place over fibreboard overlay boards, mopped in place over tapered backslope (Roof 8 only) and polyisocyanurate insulation mopped in place over self-adhering base sheet vapour barrier adhered over existing asphaltic vapour barrier and gypsum boards mechanically fastened in place over the existing metal deck. Membrane flashing to be 2-ply modified bitumen membranes, 1-ply modified bitumen membrane (base sheet) mopped in Type III asphalt and 1-ply granulated modified bitumen membrane (cap sheet) torched in place.

1.6 PRE-START MEETING

- 1.6.1 A pre-start meeting is to be scheduled one week prior to any work commencing. The roofing contractor, the consultant, the on-site contact and/or owner's representative should be present.
- 1.6.2 The following items will be discussed at the pre-start meeting:
 - .1 methods and procedures relating to the roof assembly installation
 - .2 on-site procedures
 - .3 on-site material storage
 - .4 the construction schedule

1.7 DELIVERY, STORAGE & HANDLING

- 1.7.1 Delivery, storage, and handling are listed in the GENERAL CONDITIONS under section 01 66 00 STORAGE & DELIVERY OF MATERIALS.

PART 2 PRODUCTS

2.1 MATERIALS

- 2.1.1 Roof Membrane (Modified Bitumen - Cap Sheet): Modified bituminous membranes, granulated top and thermofusible bottom surfaces, 250gm/sq.m., non-woven polyester reinforced, conforming to CSA A123.23 Type II
- 2.1.2 Roof Membrane (Modified Bitumen - Base Sheet): Modified bituminous membranes, 180gm/sq.m., glass fibre mat/glass scrim polyester reinforcing with SBS rubber modified asphalt conforming to CSA A123.23 Type II
- 2.1.3 Flashing Membrane (Modified Bitumen - Cap Sheet): Modified bituminous membranes, granulated top and thermofusible bottom surfaces, 250gm/sq.m., non-woven polyester reinforced, conforming to CSA A123.23 Type II
- 2.1.4 Flashing Membrane (Modified Bitumen - Base Sheet): Modified bituminous membranes,

- 180gm/sq.m., glass fibre mat/glass scrim composite reinforcing with SBS rubber modified asphalt conforming to CSA A123.23 Type II
- 2.1.5 Overlay Board: 13mm (0.5") High density fiberboard insulation (4'x4' boards), factory coated on one side, conforming to CAN ULC-S706-09 Type II, Class 1
- 2.1.6 1% Tapered Insulation (Roofs 1-7): Fully tapered polyisocyanurate insulation to provide a slope of 1.0% as per design. Crickets are to be used at all openings and/or mechanical curbs. Flat areas around the drains are not to exceed 50ft². Meeting and exceeding the requirements of CAN/CSA-A247-M86 and CAN/ULC-S706.
- 2.1.7 Tapered Edge Strips – Backslope (Roof 8 Only): Closed-cell polyisocyanurate foam core integrally bonded to inorganic coated-glass facers. 24" wide strips, from 2" to 0" taper.
- 2.1.8 Insulation: 51mm (2.0"), 64mm (2.5") Polyisocyanurate insulation (4' x 8' boards). Type: closed cell polyisocyanurate foam roof board insulation with inorganic coated glass facer, meeting the requirements of CAN/ULC S704, Type 2 Class 3 materials and ASTM C1289, Type II, Class 2, Grade 2.
- 2.1.9 Insulation Sump: Polyisocyanurate, pre-manufactured, one-piece drain sump. Meeting the requirements of CAN/ULC S704. Drain sumps to be 2440mm x 2440mm (8'x8')
- 2.1.10 Asphalt:
- .1 Type II conforming to CSA A123.4M / ASTM D312
 - .2 Type III conforming to CSA A123.4M / ASTM D312
- 2.1.11 Asphalt Primer: Conforming to ASTM D41
- 2.1.12 Gypsum Boards (If Required): 13mm (0.5") Gypsum subdeck boards (4'x8' sheets). Acceptable Product: DensDeck Prime by Georgia Pacific or approved alternate.
- 2.1.13 Gypsum Fasteners (If Required): Corrosion resistant plates and fasteners as required and approved by the insulation manufacturer.
- 2.1.14 Vapour Barrier: Modified bituminous membranes, 95gm/sq.m., with sanded top and bottom surfaces, polyester reinforcing with SBS rubber modified asphalt conforming to CSA A123.23
- 2.1.15 Vapour Barrier Primer: As recommended by material Manufacturer
- 2.1.16 Asphalt Protection Board: 6.35mm (1/4") thick (4'x4') boards, torch safe, semi-rigid protection board.
- 2.1.17 Self-Adhering Membrane (Perimeter Parapets): Self-adhering, self-sealing, composite membrane consisting of a high softening point with SBS rubberized asphalt compound.
- 2.1.18 Self-Adhering Membrane Adhesive (Perimeter Parapets): Rubber based adhesive for self-adhering membranes.
- 2.1.19 Mastic: One-part, solvent & asbestos free, moisture curing elastomer.
- 2.1.20 Liquid Applied PMMA Membrane Flashings: Two-component polymethacrylate liquid membrane with catalyst and mesh reinforcement. UV stable and VOC compliant. Conforming to ASTM D5147.

2.2 ACCESSORIES

- 2.2.1 Wood Blocking, Plywood Sheathing: Construction grade; free from warping and visible decay; pressure-treated spruce, to CAN/CSA O80 SERIES-08.
- 2.2.2 Cant Strip: fire resistant, fibre cant
- 2.2.3 Cant Strip Adhesive: solvent free, fastener free, insulation attachment; Fas-n-Free Adhesive by Tremco.
- 2.2.4 Metal Flashing: 26 gauge pre-painted galvanized; Series 8000 baked enamel finish; colour to

- match existing, to ASTM A653/A653M-10. 24-gauge metal for all cleats and hook strips. Colour to be confirmed by the Owner.
- 2.2.5 Pitch Pan: Pre-manufactured type; 16 oz. copper, fully soldered, minimum 152.4 mm (6") high above finished roof level, complete with copper caps and sealant.
- 2.2.6 Pitch Pan Sealant: M-1 Structural sealant and 1-part pourable sealer by ChemLink or Joint & Termination Sealant #9600 and Semi-Self Leveling Sealer #4500 by Lucas
- 2.2.7 Sealant: single component; moisture cure; polyurethane sealant conforming to ASTM-C920.
- 2.2.8 Fasteners: 25 mm square or round head, ring shanked galvanized or non-ferrous type, length as required to suit application.
- 2.2.9 All Specified Platinum Technologies Ltd. Products must be Platinum Plus and must be purchased directly through Platinum. Please contact the following for estimates and order placement: Paul Whitehead, (888) 771-4686
- 2.2.10 Drains: boxed copper retro drain with flange, with dome and seals by Platinum Technologies Inc.
- 2.2.11 Control Flow Mechanism: By Platinum Technologies Inc. (if required by Municipality)
- 2.2.12 Vent Stack: insulated aluminum vent stack with factory applied polyurethane foam insulation and vent stack cap. By Platinum Technologies Inc.
- 2.2.13 Tall Cones: all sizes (1.5" – 12"): By Platinum Technologies Inc.
- 2.2.14 Gooseneck Flashing: 30" Stainless Steel Gooseneck 1.9" I.D. and Spun Aluminum Base
- 2.2.15 Termination Bar: 10' Alum Term Bar – Item NO. – Term-10 (#90354) By Platinum Technologies Inc.
- 2.2.16 Scuppers: Sheet metal with soldered joints, 203 mm (8") width and 102 mm (4") height.
- 2.2.17 Gas Line Supports: Adjustable gas line supports on insulated padding.
- 2.2.18 Gas Line Paint: Paint to conform to CSA B149.1. Tremclad Yellow by Tremco or Corrostop by SICO.
- 2.2.19 Hot Stack Paint: Furnace stacks. B-vent (Hot)Stacks, Double-Duty Aluminum by Tremco.
- 2.2.20 Concrete Pavers: Wire mesh reinforced with 6-8% air entrainment and to 30 MPa. Size to be 610 mm x 610 mm (24" x 24"). Thickness of 45 mm (1.75"). Colour to be natural with Diamond texture top surface.
- 2.2.21 Concrete Paver Insulation Pad: Closed cell extruded polystyrene (XPS) insulation, Type IV. Compressive strength of 240 KPa (35 psi) and formed using the Hydrovac process. Size 508 mm x 508 mm (20" x 20") thickness of 25 mm (1").
- 2.2.22 Foam Gasket: EMSEAL MST Multi-Use Sealant Tape or EMSEAL UST Sealant Tape.

NOTE: The contractor must supply all primers, mastics, and membranes from a single source Manufacturer. No alternates will be accepted without written approval from the Consultant

PART 3 EXECUTION

3.1 PREPARATION

- 3.1.1 Supply and install perimeter safety warning as prescribed by the Ontario Occupational Health and Safety Code and all local codes before starting any other work.
- 3.1.2 It is the contractor's responsibility to obtain all required permits for this project and must carry this cost in his bid price.
- 3.1.3 The ground areas around the building are to be protected as much as possible. All disposal

boxes must be placed on planks. The interior areas of the building, where the roofing contractor has access, are to be protected.

- 3.1.4 It is the responsibility of the roofing contractor to contact the Owner to mark the exact location of buried utilities.
- 3.1.5 Remove the existing roofing down to the existing asphaltic vapour barrier. Dispose of all debris at an appropriate licensed dump site. No garbage is to be stored on the roof. Remove the existing metal flashings and membrane flashings down to the existing substrates.
- 3.1.6 If required, should the metal deck be found to be deteriorated, requiring replacement, the roofing Contractor is responsible to document all areas with photographs and measurements indicated on a roof plan, on a daily basis and provide them to both the Consultant and Owner. Metal deck replacement quantities proposed for replacement are to be approved in writing by the Consultant and Owner prior to any area being replaced.
 - .1 If surface corrosion is observed on the metal deck surface, the corrosion is to be wire brushed and coated with two (2) coats of rust inhibiting paint.
 - .2 Should the existing metal deck require replacement, the roofing contractor is responsible to have an engineer review the installation of the metal deck and provide a written and stamped report indicating that the deck has been installed according to code requirements and is structurally adequate. All reports are to be submitted to the Consultant and Owner.
- 3.1.7 If required, inspect the structural deck and report any deficiencies to the Owner's Representative. Do not apply any new roofing over deficiencies, other than temporary waterproofing, until all deficiencies have been corrected.
- 3.1.8 Do not remove more of the existing roofing than can be completely waterproofed in one day.
- 3.1.9 The roofing contractor shall be responsible for all roof leaks (both on the existing roofing assembly and the new roofing assembly) at the building once they begin to set-up and load materials onto the roof at the beginning of the project.
- 3.1.10 The roofing contractor is responsible to disconnect and reconnect any mechanical, electrical conduit, cabling, and/or gas lines which are affecting the roof installation. The roofing contractor is responsible for all satellites. The satellites are to be moved and put back in the approximate same location. Roofing contractor is responsible for repositioning satellites to obtain proper signal.
- 3.1.11 Should wall anchors, roof anchors, and/or davit arm bases require re-certification it will be the roofing contractor's responsibility to do so and is to be carried in the tender price.
- 3.1.12 Remove all designated redundant equipment, pipes, cones, pitch pans, conduits, unused anchors, davits and equipment as identified by the Owner.

3.2 FIRE WATCH

- 3.2.1 It is absolutely required that in all areas where a thermofusible (torch applied) membrane was applied, the work area be carefully inspected for fire, **a minimum of 3 hours** after work has stopped for the day, using an infrared gun and before the crew leaves the roof.
- 3.2.2 Comply with Section 01 51 16 – Temporary Fire Protection.

3.3 ASPHALT PREPARATION

- 3.3.1 Prepare asphalt according to Manufacturer's instructions. If heating temperatures are not supplied on the containers or Bills of lading, for the asphalt on site, heat to no more than the temperatures listed below.

Mechanical Application	Mop Application
Type II 221 °C (+/- 15 °C) 450 °F (+/- 25 °F)	Type II 210 °C (+/- 15 °C) 410 °F (+/- 25 °F)
Type III 239 °C (+/- 15 °C) 462 °F (+/- 25 °F)	Type III 225 °C (+/- 15 °C) 437 °F (+/- 25 °F)

- 3.3.2 Maintain asphalt in tanker or kettle below its Final Blowing Temperature (FBT) of 260°C (500°F) as indicated on Bill of Lading or container. In cold weather insulate delivery pipes and transport bitumen in insulated carriers on the roof.
- 3.3.3 Bitumen shall not be heated to Flash Point or FBT for more than four (4) hours.
- 3.3.4 Apply asphalt at temperatures noted in the above table.
- 3.3.5 Ensure an accurate thermometer independent of the kettle thermometer or heat gun is used to monitor the asphalt temperature. Consultant may request a daily temperature Log.
- 3.3.6 Asphalt Quantities:
 - .1 Insulation or cover board mopping: 1.0 kg/m² (20 lbs. / 100 ft²)
 - .2 Glass Ply Sheet interply mopping: 1.2 kg/m² (25 lbs. / 100 ft²)
 - .3 Base Ply interplay mopping: 1.0 kg/m² (20 lbs. / 100 ft²)
 - .4 Glaze Coat: 0.49-0.73 kg/m² (10-15 lbs. / 100 ft²)
 - .5 Flood Coat (Top Pour): 2.9 kg/m² (60 lbs. / 100 ft²)

3.4 REDUNDANT EQUIPMENT/OPENINGS

- 3.4.1 Remove all designated redundant equipment, pipes, cones, pitch pans, etc. Install new metal decking matching the existing thickness. Metal will be installed on a continuous bead of elastomeric sealant and screwed down with stainless steel self-tapping screws a minimum of 152.4mm (6") on centre around the perimeter. All redundant equipment will be marked with yellow paint by building operator.

3.5 CARPENTRY

- 3.5.1 Construct wood blocking as per details. Build-up all perimeter details to accommodate the height of the new roof assembly. Outside perimeter wood blocking is to be 8" above the finished roof surface (above finished surface) and sloped inward toward the roof. Install sloped wood blocking along the outside perimeters. Build-up all unit curbs a minimum of 304.8mm (12") above the finished roof level to accommodate the height of the new roofing assembly where required.
- 3.5.2 Offset blocking layers 304.8mm (12") and weave corners.
- 3.5.3 Assemble blocking using two staggered rows of nailing. Space nails in any row a maximum of 609.6mm (24") on centre. Within 2440mm (8') of outside corners, reduce maximum spacing to 304.8mm (12") on centre.
- 3.5.4 Install asphalt protection board along all perimeters, curbs and walls, from the top of the deck to the top of the details. The asphalt protection board is to be secured 6" on center horizontally with fasteners spaced no more than 12" on center vertically.

3.6 GYPSUM BOARDS (IF REQUIRED)

- 3.6.1 Ensure existing gypsum boards are mechanically fastened in place over the existing deck. All gypsum board edges and ends are to be butted tight. Gypsum boards are to be staggered.
- 3.6.2 If required for roofs with a metal deck, install the new gypsum boards, mechanically fastened

in place over the existing metal deck. All gypsum board edges and ends are to be butted tight. Gypsum boards are to be staggered.

- 3.6.3 Ensure that all gypsum boards are fully supported. Mechanically fasten the gypsum boards with 10 fasteners per 4'x8' board within the field. 16 fasteners per 4'x8, board within 12' of the perimeters and 32 fasteners per 12'x12' area within the corners.
- 3.6.4 If required for roofs with concrete deck, install the gypsum boards in a full mopping of Type II asphalt.
- 3.6.5 It is the roofing contractor's responsibility to confirm the location of any conduits, on the underside of the metal deck, prior to and during the fastening of gypsum boards. Should any conduits be damaged, it will be the roofing contractor's responsibility to repair them at their own costs.

3.7 VAPOUR BARRIER

- 3.7.1 All substrates to receive vapour barrier are to be prepared as recommended by manufacturer.
- 3.7.2 Over the clean, dry and prepared concrete apply 1-ply of base sheet vapour barrier membrane fully mopped in Type II asphalt over the existing asphaltic vapour barrier.
- 3.7.3 Roll out the vapour barrier and allow it to relax prior to application. Cut lengths to fit the application. Set in place and pull back the release film 152.4mm to 304.8mm (6" to 12") and place it on the prepared surface. Remove the release film from the remainder of the sheet and apply pressure to ensure proper contact with prepared surface.
- 3.7.4 Overlaps: side laps to be 76.2mm (3") and end laps to be 152.4mm (6")
- 3.7.5 Commence the vapour barrier application at the lowest edge of drain. Proceed up the slope from the lowest point on the roof.
- 3.7.6 At terminations and penetrations, the vapour barrier is to be extended up the vertical surface, above the insulation a minimum of 50.8mm (2"). Where cant strips are to be installed the vapour barrier is to be extended 50.8mm (2") above the top of the cant strip.

3.8 INSULATION, TAPERED INSULATION & FIBREBOARD OVERLAY

- 3.8.1 Ensure the vapour barrier is clean, dry, continuous and ready for insulation application.
- 3.8.2 Install one layer of 51mm (2.0") or 64mm (2.5") polyisocyanurate insulation (depending on roof area) 1219mm x 2438mm (4' x 8' boards), in Type II asphalt at a rate of not less than 20 lbs. per 100 sq. ft. Insulation is to be placed with all joints staggered a minimum of 609.6mm (2') per row and butted tight together with no gaps between boards.
- 3.8.3 Where two layers of insulation are to be installed, apply second layer of 2.5" polyisocyanurate insulation 1219mm (4' x 4' boards), in Type II asphalt at a rate of not less than 20 lbs. per 100 sq. ft., over the first layer of insulation. Insulation is to be placed with all joints staggered a minimum of 609.6mm (2') per row and butted tight together with no gaps between boards.
- 3.8.4 Keep insulation a minimum of 75mm (3") from heat emitting devices and a minimum of 52mm (2") from sidewalls of CAN/ULC S604 Type "A" chimneys and CN/CGA 149.2 Type B & L vents, (commonly called B-Vents or Hot Stacks).
- 3.8.5 Install tapered insulation boards or tapered backslope (depending on roof area) in a full mopping of Type II asphalt, at a rate of not less than 20 lbs. per 100 sq. ft., as designed.
- 3.8.6 Install one layer, 13mm (0.5") high density cover board, in a full mopping of Type II asphalt, at a rate of not less than 20 lbs. per 100 sq. ft. over the polyisocyanurate insulation and carried over the drain sumps. Butt boards tightly together. Stagger all joints. Ensure that the joints of the polyisocyanurate insulation layer and the cover board are not directly over one another.
- 3.8.7 Ensure that all insulation boards are fully supported, joints staggered, and all edges are butted

tight with no gaps between boards.

- 3.8.8 Do not apply more insulation than can be covered with membranes in the same Workday.
- 3.8.9 Install sloped prefabricated insulation sumps 2438.4mm x 2438.4mm (8'x8') around all roof drains. Adjust the insulation thickness to accommodate the sumps.
- 3.8.10 No damaged or wet insulation will be accepted. All rejected materials will be marked and must be stored on site. They are not to be removed until the Project is completed.

3.9 MEMBRANE APPLICATION – BASE SHEET

- 3.9.1 Unroll the modified bituminous base sheet membranes and allow them to relax, as per manufacturer's written instructions. Ensure the modified bituminous base membranes are clean and dry.
- 3.9.2 Over the overlay boards, apply 1-ply base sheet membrane fully hot mopped in place using Type II asphalt.
- 3.9.3 Apply 1-ply of base ply membrane fully hot mopped in place using Type II asphalt at a rate of 20 – 25 lbs. per 100 sq.ft, over the newly installed overlay board.
- 3.9.4 Do not stand on the newly embedded sheet to unroll the membrane. Do not walk on the membrane until the asphalt has set up. **Gang rolling of sheets are not allowed.**
- 3.9.5 All end laps in the field of the roof are to be staggered.
- 3.9.6 Ensure that the base sheet membranes lie flat, with no wrinkles, fishmouths, or blisters, and are fully bonded.

3.10 MEMBRANE APPLICATION – CAP SHEET

- 3.10.1 Unroll the granulated modified bituminous cap sheet membranes and allow them to relax, as per manufacturer's written instructions. Ensure the modified bituminous base membranes are clean and dry.
- 3.10.2 Offset all cap sheet membranes 457.2mm (18") from the base sheet membranes.
- 3.10.3 Beginning at the drains, perpendicular to the slope and shingled to shed water, install the modified bituminous cap sheet fully adhered in place to the base sheet. The modified bituminous cap sheet field membranes are to be terminated at the top of the cant strip.
- 3.10.4 Install the modified bituminous cap sheet membrane in parallel courses with the end laps staggered a minimum of 914.4mm (36") from each other and a minimum of 914.4mm (36") from the base sheet membranes. Side laps are to be 76.2mm (3") and end laps are to be 152.4mm (6"). All corners, at end laps are to be cut as per membrane manufacturer's requirements.
- 3.10.5 Ensure that approximately 6.35mm (1/4") bleed out is achieved at all laps.
- 3.10.6 Ensure that the cap sheet membranes lie flat, with no wrinkles, fishmouths, or blisters, and are fully bonded.

3.11 NIGHT SEAL

- 3.11.1 Roofer is responsible to have all roofs closed-in and in a watertight condition at the end of each production day.
- 3.11.2 It is the Foreman's responsibility to thoroughly check this detail at the end of each day before leaving the roof.

3.12 MEMBRANE FLASHINGS

- 3.12.1 Install flashings, including laps, splices, joints, bonding, adhesion and attachment as required and in accordance with manufacturer's written instructions and details.

- 3.12.2 Install flashings to ensure the roof is watertight at the end of each working day.
- 3.12.3 Membrane flashings will be comprised of 1-ply modified bituminous base sheet membrane in Type II asphalt and 1-ply granulated modified bituminous cap sheet membrane torched in place.
- 3.12.4 The contractor is responsible to disconnect and reconnect any electrical conduit, metal railings, ladders, cabling, and/or gas lines which affect the roof installation.
- 3.12.5 Flashing membranes are to be terminated 304.8mm (12") above the base of vertical surfaces at all locations.
- 3.12.6 Perimeter (Outside Perimeters):
- .1 Raise the existing perimeter to accommodate the height of the new roof assembly and slope inward towards the roof, as per details.
 - .2 Install 6.35mm (1/4") asphalt recovery board over exposed substrate. Asphalt recovery board is to be continuous. It is to extend from the top of the metal deck to the top of the wall.
 - .3 After the application of the modified bituminous base sheet field membranes, apply 1-ply modified bituminous base sheet flashing membranes hot mopped in place, extending onto the field of the roof a minimum of 101.6mm (4").
 - .4 Once the modified bituminous cap sheet field membranes have been installed, 1-ply modified bituminous granulated cap sheet flashing membranes are to be fully torched in place, extending onto the field of the roof a minimum of 101.635mm (4"). Cap sheet flashing membrane to be installed in 1-meter widths with 76.2mm (3") side laps. Cap sheet flashing side laps to be staggered 101.635mm (4") from the cap sheet field membrane overlaps.
 - .5 Continuously seal the top edge of the granulated modified bituminous cap sheet membrane flashings with elastomeric sealant.
 - .6 At high wall locations, a termination bar is to be installed through the flashing membranes, approximately 12.7mm (0.5") below the top of the membrane. It is to be secured 152.4mm (6") on centre.
 - .7 Fully cover the membrane flashings with new pre-painted metal flashings.
- 3.12.7 Masonry Wall (Inside Perimeter):
- .1 Flashing membranes at masonry walls are to be terminated 304.8mm at the top of the masonry walls. If weep holes are present in the masonry, flashing membranes are to be kept one brick course below the weep holes.
 - .2 Apply one coat of quick dry primer on all surfaces to receive modified bituminous membranes at a rate of 150 sq.ft. per gallon. Ensure that all surfaces are clean and dry before primer application.
 - .3 After the application of the base sheet field membranes, apply 1-ply modified bituminous base sheet flashing membrane fully mopped in place.
 - .4 After the installation of the cap sheet field membrane, apply 1-ply granulated modified bituminous cap sheet, torched in place, extending a minimum of 101.6mm (4") beyond the modified bituminous membrane base sheet flashings onto the roof surface and extending to the top of the perimeter. Ensure that the laps of the granulated modified bituminous cap sheet flashings do not coincide with the laps of the modified bituminous membrane base sheet flashings.
 - .5 Continuously seal the top edge of the flashing membranes with elastomeric sealant.
 - .6 A termination bar is to be installed through the flashing membranes, approximately

12.7mm (0.5") below the top of the membrane. It is to be secured 152.4mm (6") on centre.

- .7 Fully cover the membrane flashings with new pre-painted metal flashings and apply a continuous bead of sealant between the masonry and new metal flashings.

3.12.8 Metal Wall Siding:

- .1 Remove the existing membranes down to the existing substrate. Flashing membranes at the siding wall are to be terminated up the wall a minimum of 304.8mm(12") above the top of the cant strip. Remove the bottom row of fasteners on the metal siding panels to reveal the underlying flashings. Peel up the existing membrane flashings to allow for the installation of new asphalt protection board and new membrane flashings. Shingle over the existing wall membranes.
- .2 Install 6.35mm(1/4") asphalt protection board over exposed substrate from the top of the existing sub deck to the top of the detail.
- .3 Apply one coat of primer on all surfaces to receive modified bituminous membrane flashings. Ensure that all surfaces are clean and dry before primer application.
- .4 After the application of the base sheet field membranes, apply 1-ply modified bituminous base sheet membrane flashing mopped in place and extending a minimum of 101.6mm(4") beyond the toe of the cant strip. Membrane flashings are to be extended to the top of the detail.
- .5 Side laps are to be 76.2mm(3") and end laps are to be 152.4mm(6"). Once the modified bituminous base sheet membrane flashings have been applied, use a roller to apply even pressure to the membrane, ensuring the membrane is smooth, free from wrinkles, blisters, fishmouths and fully bonded in place.
- .6 After the application of the cap sheet field membrane apply 1 ply granulated modified bituminous cap sheet, torched in place, extending a minimum of 101.6mm(4") beyond the modified bituminous membrane base sheet flashings onto the roof surface and extending to the top of the detail. Ensure that the laps of the granulated modified bituminous cap sheet flashings do not coincide with the laps of the modified bituminous membrane base sheet flashings.
- .7 A termination bar is to be installed through the flashing membranes, approximately 12.7mm(1/2") below the top of the membranes. It is to be secured 152.4mm(6") on centre.
- .8 Continuously seal the top edge of the granulated cap sheet with elastomeric sealant.
- .9 Shingle the existing membrane flashings/peel & stick (cut and left in place) over the new membrane flashings.
- .10 If required, install new metal drip closure, to be tucked behind the existing wall panels and mechanically fastened in place. Install new wall panel fasteners one gauge larger than existing where removed. Fully cover the membrane flashings with new pre-painted metal flashings.

3.12.9 Equipment Curb Flashings:

- .1 Build-up all unit curbs a minimum of 304.8mm (12") above the finished roof level to accommodate the height of the new roofing assembly where required.
- .2 Install 6.35mm (1/4") asphalt recovery board over exposed substrate. Asphalt recovery board is to be continuous. It is to extend from the top of the metal deck to the top of the curb.
- .3 Temporarily disconnect each HVAC/fan unit, completely lift the unit off the curb and set it on the roof while flashing the curb. The curb is to be set on plywood, protecting the roof

membrane. Once the curb has been flashed, the unit is to be lifted off the roof and set back on the curb. Then once the unit has been reinstalled and reconnected it is to be tested to ensure it is working properly. The unit work must be performed only by qualified HVAC contractors. Roofing contractor is responsible for these costs in his bid price.

- .4 Apply one coat of quick dry asphalt primer on all surfaces to receive asphalt at a rate of 150 sq. ft. per gal. Ensure that all surfaces are clean and dry before primer application.
- .5 After the application of the modified bituminous base sheet field membrane, apply 1 ply of modified bituminous base sheet flashing membrane fully mopped in place, extending over top of the curb, and down onto the field of the roof a minimum of 101.6.35mm (4").
- .6 After the application of the modified bituminous cap sheet field membrane, apply 1 ply of modified bituminous cap sheet flashing membrane fully torched in place, extending onto the field of the roof. Extending a minimum of 101.6.35mm (4") beyond the 1st ply onto the field of the roof and extending over top of the curb. Ensure that the laps of the 2nd ply do not coincide with the laps of the 1st ply.
- .7 The cap sheet flashing membrane is to be nailed every 150.8mm (6") o.c. at the top of the curb.
- .8 Fully cover the membrane flashings with new pre-painted 26-gauge metal.
- .9 Install new foam gasket over top of the metal flashings prior to reinstalling mechanical equipment. Ensure foam gasket is continuous, creating a permanent seal between the mechanical equipment/skylights and metal flashings.

3.12.10 Equipment Sleepers/Separation Curb:

- .1 Build-up all sleepers/separation curbs a minimum of 203.2mm (8") above the finished roof level to accommodate the height of the new roof assembly where required. Wood blocking and cant strip to be pressure treated. Ensure positive drainage between sleepers and under the mechanical equipment.
- .2 Temporarily disconnect each HVAC/fan unit, completely lift the unit off the sleepers and set it on the roof while flashing the sleepers. The HVAC/fan unit is to be set on plywood, protecting the roof membrane. Once the sleepers have been flashed, new metal is to be installed, the unit is to be lifted off the roof and set back on the curb. Once the unit has been reinstalled and reconnected, it is to be tested to ensure it is working properly. The unit work must be performed only by qualified HVAC contractors. The roofing contractor is responsible for these costs in his/her bid price.
- .3 Apply one coat of quick dry primer on all surfaces to receive modified bituminous membranes at a rate of 150 sq.ft. per gallon. Ensure that all surfaces are clean and dry before primer application.
- .4 After the application of the base sheet field membranes, apply 1-ply of modified base sheet membrane fully hot mopped in place using Type III asphalt extending on the roof surface a minimum of 101.6mm (4") on each side of the sleeper/separation curb.
- .5 After the application of the cap sheet field membrane, apply 1 ply granulated modified bituminous cap sheet heat welded in place extending a minimum of 101.6mm (4") beyond the base sheet membrane onto the roof surface on each side of the sleeper/separation curb.
- .6 The cap sheet flashings are to be extended a minimum of 203.2mm (8") beyond the toe of the cant strip onto the field of the roof, on both sides of the sleepers.
- .7 Fully cover the membrane flashings with new pre-painted metal.

3.12.11 Expansion Joint:

- .1 Remove the existing control joint/expansion joint down to the existing curb or deck. Cut

back the existing roof assembly (if required) to allow for the installation of the new expansion joint.

- .2 Fill the gap with stone wool batt insulation. The gap is to be filled from the top of the metal closure to the wood blocking. Insulation is to be continuous and butted tight.
- .3 After the application of the base sheet field membranes, apply 1-ply modified bituminous base sheet membrane flashings in full mopping of Type III asphalt. Membrane flashing is to extend over top of the curb and down onto the field of the roof a minimum of 101.6mm(4").
- .4 Install an additional ply of modified bituminous base sheet flashing membrane extending overtop of the expansion joint detail on both sides of the curb fully covering the detail.
- .5 After the application of the cap sheet field membrane, apply 1-ply modified bituminous cap sheet membrane flashing torched in place, extending a minimum of 101.6mm (4") beyond the 1st ply onto the field of the roof and overtop of the curb. Ensure the laps of the 2nd ply do not coincide with the laps of the 1st ply.
- .6 Install an additional ply of granulated cap sheet flashing membrane extending overtop of the expansion joint detail on both sides of the curb fully covering the detail. All seams and laps of the granulated cap sheet membrane are to be hot air welded.
- .7 Fully cover the membrane flashings with new pre-painted metal flashings.

3.12.12 Pitch pans:

- .1 All pitch pans will be replaced. Pitch pans must be a minimum of 152.4mm (6") high with a 102mm (4") primed roof flange. The sides of the pan will be a minimum of 52 mm (2") from the projection. Where possible use a gooseneck instead of a pitch pan. Non-flexible pipes will require a pitch pan. Gooseneck flashing to be used with flexible electrical feed lines.
- .2 Over the new 2-ply roofing membranes, embed the flange of the pitch pan/gooseneck in elastomeric sealant.
- .3 Install one (1) ply of modified bituminous base sheet membrane in Type III asphalt over the flange applied tight to the upright and extending a minimum of 204mm (8") beyond the flange.
- .4 Apply one (1) ply granulated modified bituminous cap sheet membrane extending a minimum of 102mm (4") beyond the ply of modified bituminous base sheet membrane onto the roof surface. Elastomeric sealant is to be applied where the modified bituminous membranes meet the pitch pan along the base.
- .5 Ensure the penetration and the inside walls of the new pitch pans are clean and free from any dirt or debris before applying any sealant.
- .6 Apply M1 structural sealant around the inside walls and base of the pitch pan. Apply M1 sealant around the roof projection.
- .7 Fill all pitch pans using 1-part pourable sealant.
- .8 Install new pitch pans as required at mechanical units and at other roof penetrations/projections. No conduits, satellite cables, or gas lines are to be carried through the curb flashings. The roofing Contractor is responsible for the disconnection and reconnection, where required using a Mechanical / Electrical Sub-Contractor.

3.12.13 Vents/Plumbing Stacks:

- .1 The stack jack flange must be primed before installation. Paint all existing vent stacks using Double "D" aluminum paint.
- .2 All existing plumbing vent (soil stack) pipes are to be extended to suit, so that the inside

portion of the cap is within the plumbing vent pipe. Stacks to be a minimum of 304.8mm (12") above the finished roof surface. All stacks are to be pre-insulated as listed in the Materials section. Mechanically fasten cap with Two (2) self-tapping, stainless steel metal screws.

- .3 Secure a metal cone flashing down to the deck. The cone must extend up past the finished roof level a minimum of 52mm (2"). Install the roofing vapour retarder so that it extends above the insulation surface and onto it 152.4mm (6"). The insulation should butt up against the metal cone
- .4 Over the new 2-ply roofing membranes, embed the flange of the soil stack in elastomeric sealant.
- .5 Install one (1) ply of modified bituminous base sheet membrane in Type III asphalt over the flange applied tight to the upright and extending a minimum of 204mm (8") beyond the flange.
- .6 Apply one (1) ply of granulated modified bituminous cap sheet membrane in Type III asphalt extending a minimum of 102mm (4") beyond the ply of modified bituminous base sheet membrane onto the roof surface. Elastomeric sealant is to be applied where the modified bituminous membranes meet the stack flashings along the base.
- .7 Stack is to be insulated. Mechanically fasten cap with TWO (2) self-tapping, stainless steel metal screws.

3.12.14 Furnace Stacks:

- .1 Replace any damaged cones. Prime all flanges, paint all existing furnace stacks using Double "D" aluminum paint.
- .2 Mechanically fasten a metal tall cone flashing down to the metal deck. The tall cone must extend up past the finished roof level a minimum of 52mm (2"). Install the roofing vapour retarder so that it extends above the insulation surface and onto it 152.4mm (6"). The insulation should butt up against the metal cone.
- .3 Over the new four (4) ply roofing membranes, embed the flange of the tall cone flashing in elastomeric sealant
- .4 Install one (1) ply of modified bituminous mop grade base sheet membrane in Type III asphalt over the flange applied tight to the upright and extending a minimum of 204mm (8") beyond the flange.
- .5 Apply one (1) ply granulated modified bituminous cap sheet membrane extending a minimum of 102mm (4") beyond the ply of modified bituminous base sheet membrane onto the roof surface. Elastomeric sealant is to be applied where the modified bituminous membranes meet the tall cone stack flashings along the base.
- .6 Hand insulate with portion of batt insulation after the tall cone is installed over the mechanical pipe.
- .7 Replace any damaged rain collars and re-caulk all collars

3.12.15 Overflow Scuppers:

- .1 Remove the existing scupper drains. Install new fully soldered copper scupper drain. The new scupper drains are to have a 152.4mm x 152.4mm (6"x6") tail piece to accept new 24 gauge pre-painted metal, open faced downpipes.
- .2 Apply one coat of quick dry primer on all surfaces to receive asphalt and membranes at a rate of 150 sq. ft. per gallon. Ensure that all surfaces are clean and dry before primer application.
- .3 The field membranes are to be extended directly into the scupper opening fully covering

the wood blocking.

- .4 The new scupper drain is to be primed to accept asphalt and membranes. New scupper is to be set into a full bed of mastic.
- .5 Install 1-ply modified bituminous base sheet membrane flashing mopped in place over the flange, using Type III asphalt. The base sheet flashings are to extend a minimum of 152.4mm(6") beyond the flange of the scupper onto the field of the roof in all directions and be carried into the scupper. The granulated modified bituminous cap sheet field membranes are to be carried into the scupper over the modified bituminous base sheet flashings.
- .6 New metal flashings are to be installed fully covering the membrane flashings and picture framing the scupper along the outside perimeter of the roof.

3.12.16 Roof Drains:

- .1 Plug the drains temporarily while working around them.
- .2 Sump the area around the new drains 12.7mm (0.5") deep and centered equally over the drain in all directions. 2440mm x 2440mm (8'x8') drain sumps are to be installed.
- .3 Over the new two (2) ply roofing membranes, install the new drain in a full bed of elastomeric sealant. Check the drainpipes on the underside of the deck to ensure the installation of the proper length of down-pipe. Ensure that the pipe does not impede the flow of water. Plug the drains temporarily while working around them.
- .4 Apply one (1) coat of primer to the flange of the drain.
- .5 Install one (1) ply of modified bituminous base sheet membrane extending a minimum of 609.6.35mm (24") from the centre of the drain.
- .6 Apply one (1) ply of granulated modified bituminous cap sheet extending a minimum of 102mm (4") beyond the ply of modified bituminous base sheet membrane onto the surface of the roof.
- .7 The new metal strainer and control flow mechanism are to be installed immediately following the installation of the flashing membranes. Therefore, if the roof has ten (10) drains and only two (2) drains have been flashed (that particular day), those two (2) drains are to have the metal strainer and the control flow mechanism installed at the end of that workday

3.12.17 Reinforced Liquid Applied PMMA Membrane Flashings:

- .1 After the application of the 2-ply modified bituminous base and cap sheet field membranes, install mastic/sealant around the base of the metal support post and the field membranes.
- .2 After mixing catalyst, apply primer to clean and prepared substrate using approved rollers or brushes. Allow primer to cure prior for a minimum of 30-45 minutes prior to the installation of the liquid applied PPMA membranes
- .3 After mixing, apply resin to substrate at a rate of 0.14 to 0.31 kg/ft² (1.5 to 3.3 kg/m²) (depending on substrate, as approved by material manufacturer) using approved rollers or brushes. The PMMA resin should be spread evenly onto the surface.
- .4 Roll PMMA Fleece reinforcement directly into the resin, avoiding any folds and wrinkles. Use a roller to work the resin into the fleece, saturating from the bottom up. The fleece should darken in appearance, with no white spots showing. When required peel back fleece and apply additional resin onto the substrate, then slowly roll the fleece back into the resin, using care to remove any air pockets. All side and end laps of scrim must have a minimum 102mm (4.0") overlap.

- .5 Apply an even coat of resin over top of the installed fleece at a rate of 0.09 kg/ ft² (1.0 kg/m²) using approved rollers. Use caution not to spread resin too thin.

3.13 GAS LINES

3.13.1 Wire brush all gas lines to remove surface rust.

3.13.2 Apply 2 coats of yellow rust inhibiting paint.

3.14 GAS LINE SUPPORTS

3.14.1 Install new adjustable supports at each pipe elbow, threaded joint, and where the pipe changes in direction, as well as approximately every 6' as per the current TSSA guidelines for the distance of the gas line/conduit tray.

Pipe O.D. Diameter in Inches (mm)	Maximum Spacing for Pipe Supports Feet (Metres)
0.5" (12.7mm) or less	Horizontal 6 feet (2 metres)
0.75-1.0" (19 -25.4mm)	Horizontal 8 feet (2.5 metres)
3-4" (75-102mm)	Horizontal 15 feet (5 metres)
5-8" (127-204mm)	Horizontal 20 feet (6 metres)
10" or larger	Horizontal 25 feet (8 metres)
All pipe sizes- Vertical	Every floor but not more than 125% of horizontal spacings.
Tubing- all sizes	Vertical & Horizontal 6 feet (2 metres)
Supports to be placed at all pipe unions, changes in directions (both sides) and at changes in elevation.	

3.15 SCUPPERS/MECHANICAL CONDENSATE PIPE/ROOF ACCESS

3.15.1 Install new concrete patio pavers on 25.4mm (1") extruded polystyrene insulation. The extruded polystyrene insulation is to be cut 50.8mm (2") smaller (all the way around) than the concrete patio pavers. Therefore, if the concrete paver is 609.6mm x 609.6mm (2'x2') the extruded polystyrene insulation should be 508mm x 508mm (1'8"x 1'8").

3.15.2 Install four concrete patio pavers pm 25.4mm (1") extruded polystyrene insulation, in a square pattern at roof hatch and all access doors.

3.16 FINISH

3.16.1 Perform a daily clean up to collect all wrappings, empty containers, and any other debris from the project site.

3.16.2 Upon completion, all debris is to be disposed of in a legally acceptable manner.

3.16.3 Prior to the final inspection, the Contractor is to perform a pre-inspection to review all work and to verify that all flashings have been completed as well as the application of all caulking.

END OF SECTION 07 52 16

07 62 00 - Sheet Metal Flashing & Trim

PART 1 GENERAL

1.1 GENERAL CONDITIONS

- 1.1.1 All conditions of the Contract and Divisions 0 and 1 apply to this section and to the requirements of the Canadian Roofing Contractors Association Roofing Manual Specifications as referred to herein.
- 1.1.2 Abide by all Federal, Provincial, Municipal and Local Laws or Codes, rules and regulations that in any way affect the work including all amendments up to the project date.

1.2 CO-ORDINATION

- 1.2.1 Co-ordinate the work of this Section with the work of:
 - .1 Section 07 11 00 Roofing Scope of Work
 - .2 Section 07 52 16 Styrene Butadiene-Styrene Modified Bituminous Membrane Roofing.
 - .3 Section 07 62 00 Sheet Metal Flashing and Trim.
 - .4 Section 07 92 00 Joint Sealants.

1.3 STANDARDS

- 1.3.1 THE ALUMINUM ASSOCIATION INC. (AAI)
 - .1 AAI-Aluminum Sheet Metal Work in Building Construction-[2002].
 - .2 AAI DAF45-[03], Designation System for Aluminum Finishes.
- 1.3.2 AMERICAN SOCIETY FOR TESTING AND MATERIALS INTERNATIONAL (ASTM)
 - .1 ASTM A167: Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM A240/A240M: Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - .3 ASTM A606: Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
 - .4 ASTM A653/A653M: Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process.
 - .5 ASTM A792/A792M: Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by Hot-Dip Process.
 - .6 ASTM B32:Solder Metal.
 - .7 ASTM B370:Copper Sheet and Strip for Building Construction.
 - .8 ASTM B813; Flux
 - .9 ASTM D41; Asphalt Primer
 - .10 ASTM D226; Asphalt or Tar Saturated Roofing felt.
 - .11 ASTM D1970; Self-Adhering Ice Dam Protection
 - .12 ASTM D523:Test Method for Specular Gloss.
 - .13 ASTM D822:Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
 - .14 ASTM F1667; Nails, Spikes and Staples
- 1.3.3 CANADIAN ROOFING CONTRACTORS ASSOCIATION (CRCA)
 - .1 Roofing Specifications Manual, latest edition.

- 1.3.4 CANADIAN SHEET STEEL BUILDING INSTITUTE (CSSBI)
 - 1. CSSBI Bulletin SSF-3; Care & Maintenance of Prefinished Sheet Steel Building Products.
 - 2. CSSBI Technical Bulletin S-8; Quality & Performance Specification for Prefinished Sheet metal Used for Building Products.
- 1.3.5 CANADIAN STANDARDS ASSOCIATION (CSA INTERNATIONAL)
 - 1. CSA A123.3: Asphalt Saturated Organic Roofing Felt.
 - 2. AAMA/WDMA/CSA 101/I.S.2/A440-[2008], Standard/Specification for Windows, Doors, and Unit Skylights.
 - 3. CSA A123.22; Self-Adhering Polymer Modified Eave Protection
 - 4. CSA B111: Wire Nails, Spikes and Staples.
- 1.3.6 GREEN SEAL ENVIRONMENTAL STANDARDS
 - 1. Standard GS-03-[93]; Anti-Corrosive Paints.
 - 2. Standard GS-11-[97]; Architectural Paints.
 - 3. Standard GS-36-[00]; Commercial Adhesives.
- 1.3.7 HEALTH CANADA/WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)
 - 1. Safety Data Sheets (SDS).
- 1.3.8 SHEET METAL & AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION (SMACNA)
 - 1. SMACNA Manual, latest Edition

1.4 APPROVAL

- 1.4.1 Do not install any metal work until the membrane flashings have been inspected and accepted by the Owner's Representative. The colour is to be determined by the Owner.
- 1.4.2 In all cases and prior to the fabrication of the finished product, supply and install a sample for approval by the Owner's representative.

1.5 SCHEDULE

- 1.5.1 Schedule the work so that the membrane flashings are not left exposed for more than 30 days.

1.6 GUARANTEE

- 1.6.1 Guarantee the metal flashing in conjunction with the membrane roofing for ONE (1) year. Submit on the same form as for the membrane roofing guarantee.

1.7 QUALITY CONTROL

- 1.7.1 Work of this Section is to be carried out by a specialist having a minimum of five years of related experience.
- 1.7.2 Work is to be performed in accordance with the practices and details of SMACNA Architectural Manual – 6th Edition (Sheet Metal and Air Conditioning Contractors National Association Inc.), unless otherwise required in the Contract Documents.

PART 2 PRODUCTS

2.1 COMPATIBILITY

- 2.1.1 Compatibility between roofing materials is an essential requirement of the Contract.

2.2 METAL COUNTERFLASHINGS

- 2.2.1 PREFINISHED STEEL METAL:

- .1 Pre-painted galvanized steel, 0.46.35mm (26 ga.) core nominal thickness, Series 8000 with a baked enamel finish to ASTM A653.
 - .2 The finish is to be Dofasco Perspectra Series, Valspar WeatherX factory baked finish, or an approved alternate.
 - .3 The colour is to be approved by the Owner.
- 2.2.2 GALVANIZED STEEL:
- .1 Galvanized sheet steel, Z275 (G90) zinc coating. Thickness as specified or shown on the Drawings.
- 2.2.3 HOOK STRIP:
- .1 Fabricated from pre-finished steel, 0.56.35mm (24 ga.) core nominal thickness, Z275 (G90) zinc coating to ASTM A653. Width minimally 102mm (4"). Colour to match prefinished sheet metal where exposed. Starter strips are to be continuous.
- 2.2.4 COPPER:
- .1 Copper to be 0.8mm (16 oz.) cold rolled to ASTM B370.
- 2.2.5 SOLDER & FLUX:
- .1 Solder to be lead-free.
 - .2 Flux is a commercial preparation suitable for materials to be soldered.
- 2.2.6 WEDGES:
- .1 Rolled Plumber sheet lead.
- 2.2.7 ISOLATION COATING:
- .1 Asphalt based back paint for application to sheet metal in contact with masonry. Use asphalt primer to ASTM D41.
- 2.2.8 PITCH PAN:
- .1 Size as specified in the Summary of Work or as shown in the Detail. One piece pre-fabricated aluminium or fabricated from 26 ga. pre-painted steel or 16 oz. Copper.
- 2.2.9 PITCH PAN FILLER:
- .1 One (1) or two (2) part elastomer such as ChemLink M-1 Sealant, Sopramastic SP-2 or approved alternate.
- 2.2.10 TOUCH-UP PAINT:
- .1 As recommended by the prefinished sheet metal Manufacturer.
- 2.2.11 FASTENERS:
- .1 Nails: Hot dipped galvanized steel flat head roofing nails of length and thickness to suit the application.
 - .2 Where exposed, use Hex Head screws with 12.7mm (1/2") dome and neoprene washers as supplied by Weather Guard, or equal.
 - .3 Fasteners for masonry and concrete: Tapcon fasteners with "Climaseal" corrosion resistant finish, or an approved equivalent, of sufficient length to provide a minimum 38mm (1.5") penetration into the substrate.
 - .4 Expansion Fasteners: A tamper-proof nail drive anchor which has a body formed from Zamac alloy. Zamac Nail-in.

PART 3 EXECUTION

3.1 GENERAL

- 3.1.1 Apply in accordance with the Drawings, Specifications and the requirements of the jurisdictional authorities and the Canadian Roofing Contractors Association's Roofing Manual.
- 3.1.2 Regard the Manufacturer's printed recommendations and Specifications as a minimum requirement for materials, methods and quality of Work not otherwise specified herein.
- 3.1.3 Make adjustments to the specified procedures caused by weather and site conditions only with the Owner's approval.
- 3.1.4 Maintain all the equipment in good working order to ensure control of roofing operations and protection of the Work. Equipment and laying techniques are to meet the approval of the Consultant.

3.2 FABRICATION

- 3.2.1 Shop fabricate the flashings and trims in accordance with the applicable requirements of SMACNA Architectural Manual and in accordance with the Contract Documents. Form sheet metal on a bending brake. Shaping, trimming and seaming on a bench.
- 3.2.2 Form sections square, true, and accurate to size, free from distortion, oil canning and other defects detrimental to the appearance and performance, and to the dimensions as indicated/required.
- 3.2.3 Fabricate the cap flashings, starter strips, and base counter flashings less than 304.8mm (12") in height in 2440mm (96") maximum lengths. Form the counter flashings between 304.8mm and 609.6.35mm (12" and 24") in height in 1219.2mm (48") maximum lengths.
- 3.2.4 Provide a counter flashing and an intermediate vertical flashing where the cap flashing is greater than 610 mm (24") above the top of the roofing membrane. Form the vertical flashings in 1220 mm (48") maximum lengths.
- 3.2.5 Provide an "S-Lock" joint at all end joints and at all horizontal joints between the cap flashing and the vertical flashing and between the vertical flashing and the base counter flashing.
- 3.2.6 Hem all exposed edges at least 12.7mm (1/2") for appearance and stiffness.
- 3.2.7 Provide a horizontal stiffening "V" or "X" break on all face metal exceeding 228.6mm (9") in girth. Centre the V or X break in mid-span of the panel. Cross break the metal face flashing on all parapet flashings exceeding 457.2mm (18") in girth.
- 3.2.8 Mitre and form the standing seams at all corners. Make allowances for movement at the joints.
- 3.2.9 Apply an isolation coating to the metal surfaces to be embedded in concrete or mortar joints.

3.3 PITCH PAN FABRICATION / INSTALLATION

- 3.3.1 All boxes shall be minimum 152 mm (6.0") high above finished roof surface, with 125 mm (5.0") roof flange as approved by the Consultant. Make all seams continuous and soldered. Tapered rain collars to be included
- 3.3.2 Install new pitch pans where required
- 3.3.3 Apply asphalt primer on the underside of flange. Embed flange in a layer of mastic on to the modified roof membrane.
- 3.3.4 Modified Bitumen: Flash in with one ply base sheet membrane to manufacturer's recommendations.
- 3.3.5 Fill the bottom two-thirds (2/3) of the pitch pan with polyurethane foam. Apply polyurethane pitch pocket sealant on the exposed interior face and fill the top third of the pitch pan with the pourable sealer. The pourable sealer is to extend 13 mm (1/2") above the pitch pan at the

centre and cove it to shed water.

- 3.3.6 Once the sealant has cured, apply the specified storm collar and clamp to existing protrusion to provide complete protection over the pitch pan. Apply sealant if required.

3.4 SCUPPER FABRICATION AND INSTALLATION

- 3.4.1 Fabricate scuppers from copper. Fabricate scuppers to suit a 102 mm (4") diameter down spout and in general accordance with CRCA standard flashing detail FL 9. Solder all joints in the scupper. Ensure flange is continuous by filling in outside corners.
- 3.4.2 Fabricate deck flange to provide a 152 mm (6") wide apron. Ensure flange is continuous by filling in outside corners. Apply isolation coating on deck flange. Provide a gravel stop soldered in place across scupper opening.
- 3.4.3 Provide copper or stainless steel strainers for outlet.
- 3.4.4 Install new scuppers at existing and/or new scupper locations, where applicable. Set pre-primed flange in a full bed of rubberized mastic for BUR and Modified bitumen membranes.
- 3.4.5 Install scuppers in general accordance with CRCA standard flashing detail FL. 9 or to Detail.

3.5 COPPER SLEEVE FABRICATION AND INSTALLATION

- 3.5.1 Fabricate sleeve flashing for existing penetrations from copper.
- 3.5.2 Provide a two piece or split sleeve with a minimum height of 305 mm (12").
- 3.5.3 Fabricate deck flange to provide a 152 mm (6") wide apron. Ensure flange is continuous by filling in outside corners.
- 3.5.4 Fabricate sleeve and flange with flat lock joints suitable for field soldering.
- 3.5.5 Apply isolation coating on surface of penetration.
- 3.5.6 Install copper sleeve flashing around penetrations.
- 3.5.7 Close and solder all joints and seams. Clean copper on joint surfaces to receive solder with steel wool. Flux and fill joints with molten solder.
- 3.5.8 Wipe and wash clean all traces of acid from the flux immediately after the joints are made.
- 3.5.9 Install split storm collar in strict accordance with Manufacturer's recommendations. Apply silicone sealant, as specified in Section 07 92 00 - Joint Sealants, at joint between storm collar and gas line penetration.
- 3.5.10 Install rain collar with sealant bead.

3.6 SHEET METAL UNDERLAYMENT INSTALLATION

- 3.6.1 Install self-adhesive bituminous membrane as per the Detail Drawings, according to Manufacturer's instructions.
- 3.6.2 Provide membrane underlayment beneath sheet metal flashings at all locations, except where membrane flashings are present.
- 3.6.3 Ensure all surface areas are free from frost, dust, grease, oil, loose or spalled material.
- 3.6.4 Apply primer as per Manufacturer's printed instructions. Allow the primer to dry and install underlayment membrane on the same day as priming.
- 3.6.5 Proceed only when weather is favourable. Should installation be undertaken at temperature below 4°C (40°F), consult Manufacturer regarding special procedures.
- 3.6.6 Maintain the recommended minimum side lap and end lap as per the Manufacturer's printed instructions.

- 3.6.7 Roll the membrane underlayment immediately after placement to ensure continuous adhesion. The roller to be of the type and size recommended by the Manufacturer.
- 3.6.8 Ensure the continuity of the membrane underlayment is maintained at all penetrations and terminations. Apply membrane sealant as required to fill inaccessible gaps following the Manufacturer's instructions.
- 3.6.9 Do not cover the membrane underlayment until it is reviewed and approved by the *Consultant*.

3.7 TERMINATION BAR INSTALLATION

- 3.7.1 Provide continuous termination bar along top of membrane flashings where indicated on Drawings and at locations and where membrane flashings terminate at the base of a wall and no other means of mechanical securement is specified or indicated.
- 3.7.2 Install the termination bar 3 mm (1/8") below the top edge of the base flashing membrane and mechanically secure to the masonry wall using 38 mm (1 1/2") Tapcon fasteners, or Zamac Nail-ins at 152 mm (6") o.c.
- 3.7.3 Seal the top of the termination bar with rubberized mastic or polyurethane based sealant.

3.8 METAL DRIP EDGE FLASHING INSTALLATION

- 3.8.1 Install new pre-finished aluminum metal drip edge along eaves at area of work.
- 3.8.2 Metal is to extend onto perimeter wood substrate 52 mm (2") minimum. Fasten metal to wood substrate with roofing nails installed every 152 mm (6") on-centre, along edge. Nails are to be set in 25 mm (1") and parallel from edge of metal.
- 3.8.3 Metal drip flashings to be fabricated up to 3048 mm (10') lengths and overlapped at joints 76.2mm (3") minimum. Apply sealant within joints prior to securement.

3.9 SHEET METAL INSTALLATION

- 3.9.1 Install the cap flashings, counter flashings, starter strips, and other miscellaneous sheet metal Work in accordance with the Contract Documents.
- 3.9.2 Provide a continuous starter (hook) strip where detailed or required to present a true, non-waving, leading edge. Fasten the starter strip to the substrate at a minimum of 304.8mm (12") on centre in a "Z" pattern using roofing nails of at least 25.4mm (1") length.
- 3.9.3 Ensure the parapet cap flashings are installed with a minimum positive slope of 2% toward the roof area. The slope is to be provided by the installation of continuous wood shims, plywood or wood blockings as detailed in accordance with Section 00 61 00 - Rough Carpentry.
- 3.9.4 Install cross-broken flat stock metal to entire parapet wall over 304.8mm (12") in height.
- 3.9.5 Caulk all horizontal joints less than 1:100 slope (1%).
- 3.9.6 Join all sheet metal with evenly spaced flat lock seams 25.4mm (1") wide to allow for thermal movement.
- 3.9.7 Counter flash bituminous flashing membranes at roof joints, walls, perimeters, parapets and curbs. Flash joints in metal flashings using S-locks and standing seams forming tight fit over hook strips. Construct internal and external mitres.
- 3.9.8 End joints where adjacent lengths of metal flashing meet to be made using an "S-lock" joint. This is to be executed by inserting the end of one length in a 25.4mm (1") deep "S" lock formed in the end of the adjacent length. The concealed portion of the "S" lock is to extend 25.4mm (1") outwards and is to be nailed to the substrate. Face nailing of joints will not be permitted.
- 3.9.9 Insert the top edge of the sheet metal flashing under the cap flashings to form weather tight junctions.

- 3.9.10 Turn the top edge of the flashings into recessed reglets or mortar joints a minimum of 25.4mm (1"). Fasten the sheet metal flashing into the reglet joint at a maximum spacing of 457.2mm (18") or more often if required.
- 3.9.11 Ensure all fasteners are located a minimum of 304.8mm (12") above the surface of the roofing membrane, unless otherwise detailed.
- 3.9.12 Where detailed or required, saw cut existing/new reglets into the masonry surfaces to receive metal flashings. The reglet is to be a minimum 19.05mm wide x 13 mm deep (3/4" x 1/2").
- 3.9.13 Lock seam corners. Do not use pop rivets.
- 3.9.14 Install the sheet metal with concealed fasteners. Exposed fastening is permitted only upon the Consultant's approval.
- 3.9.15 Use lead plugs or an approved expansion shield and screw in place with rubber washers where metal is installed over concrete or masonry.
- 3.9.16 Do not secure metal work to cant strips.
- 3.9.17 Install sheet metal in a uniform manner, level, true to line, free of warp or distortions.
- 3.9.18 Install metal flashings under cap flashings and behind other claddings a minimum of 38mm (1.5") to form a weather tight junction.
- 3.9.19 All outside perimeter cap flashings are to completely cover all fascia, or otherwise extend a minimum of 76.2mm (3") below deck or wood blocking level.
- 3.9.20 Properly cover the area to be protected with the metal flashings lightly touching the gravel pour and firmly secured to prevent movement or stripping by the wind.
- 3.9.21 No irregular or badly fitted metal work will be accepted. Provide metal strips, cleats, as required.
- 3.9.22 Install self-adhering modified bituminous membrane over all exposed masonry, concrete or wood to be flashed with metal. Secure in place.
- 3.9.23 At walls or junctions, re-cut the reglet joint, wedge the flashings with lead wedge at 304.8mm (12") o.c. Turn top edge of flashing into reglet or mortar joint a minimum of 25.4mm (1").

3.10 SEALANTS

- 3.10.1 Apply sealant at the junction between the sheet metal counterflashing and the reglet joint in accordance with Section 07 92 00 – Joint Sealants.

3.11 CLEANING

- 3.11.1 Remove completely from surfaces and crevices the flux residue, other deposits, stains and protections and wash the visible metal left unpainted

END OF SECTION 07 62 00

07 92 00 - Joint Sealants

GENERAL

1.1 GENERAL CONDITIONS

- 1.1.1 All conditions of the Contract and Divisions 0 and 1 apply to this Section and to the requirements of the Canadian Roofing Contractors Association Roofing Manual Specifications as referred to herein.
- 1.1.2 Abide by all Federal, Provincial, Municipal and Local Laws or Codes, rules and regulations that in any way affect the Work including all amendments up to the Project date.

1.2 CO-ORDINATION

- 1.2.1 Co-ordinate Work of this Section with Work of:
 - .1 Section 07 11 00 Roofing Scope of Work
 - .2 Section 07 10 00 Roofing Rough Carpentry.
 - .3 Section 07 52 16 Styrene Butadiene Styrene Modified Bituminous Membrane Roofing
 - .4 Section 07 62 00 Sheet Metal Flashing and Trim.

1.3 REFERENCE STANDARDS

- 1.3.1 Sealant work, materials, products and accessories shall be in accordance with the most current applicable industry standards including but not limited to:
- 1.3.2 AMERICAN SOCIETY FOR TESTING AND MATERIALS INTERNATIONAL, (ASTM)
 - .1 ASTM C919:-Use of Sealants in Acoustical Applications.
 - .2 ASTM C920; Elastomeric Joint Sealants, Type S, grade NS.
 - .3 ASTM C1311; Solvent Release Sealants
- 1.3.3 DEPARTMENT OF JUSTICE CANADA (JUS)
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- 1.3.4 GENERAL SERVICES ADMINISTRATION (GSA) - FEDERAL SPECIFICATIONS (FS)
 - .1 TT-S-00227E; Sealing Compound Elastomeric Type- Multi-Component, Class A, Type 2.
 - .2 TT-S-00230C; Sealing Compound elastomeric Type- Single component, Class A, Type 2.
- 1.3.5 HEALTH CANADA/WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)
 - .1 Safety Data Sheets (SDS).
- 1.3.6 TRANSPORT CANADA (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.4 CLIMATE CONDITIONS

- 1.4.1 ENVIRONMENTAL LIMITATIONS
 - .1 Do not proceed with the installation of joint sealants under the following conditions:
 - (a) When ambient and substrate temperature conditions are outside the limits permitted by the joint sealant manufacturer.
 - (b) When joint substrates are wet.
 - .2 Joint-Width Conditions:

- (a) Do not proceed with the installation of joint sealants where the joint widths are less than those allowed by the joint sealant manufacturer for the applications indicated.

.3 Joint-Substrate Conditions:

- (a) Do not proceed with the installation of joint sealants until contaminants capable of interfering with adhesion are removed from the joint substrates.

1.5 ENVIRONMENTAL REQUIREMENTS

- 1.5.1 Comply with the requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Safety Data Sheets (SDS) acceptable to Labour Canada.
- 1.5.2 Conform to the manufacturer's recommended temperatures, relative humidity, and substrate moisture content for the application and curing of sealants including special conditions governing use.

1.6 WARRANTY

- 1.6.1 Provide all applicable material and labour Warranties offered by the material Manufacturer for a minimum of two (2) years.
- 1.6.2 Defective joint sealant installation covered under Warranty is to include but not be limited to:
 - .1 joint leakage, hardening, craze cracking, crumbling, melting, bubbling, shrinkage, runs, sags, change of colour, loss of adhesion, loss of cohesion and staining of adjoining or adjacent material surfaces.
- 1.6.3 Carry out all replacement and repair Work during the Warranty period as directed by the Consultant and at no additional cost to the Owner.

PART 2 PRODUCTS

2.1 COMPATIBILITY

- 2.1.1 All materials in a sealant system are to be compatible with each other and with the substrate.
- 2.1.2 Colour or colours of the sealants are to be selected are to match existing substrate and are to be approved by the Consultant.

2.2 SEALANT MATERIALS

2.2.1 Exterior Metal To Wood, Masonry, Stone Or Porous Surfaces:

- .1 One-part elastomeric, non-sag urethane based sealant. Accepted products:
 - (a) "Dymonic" as manufactured by Tremco
 - (b) "Sikaflex 1-A" as manufactured by Sika Canada
 - (c) "Vulkem 931" by Mameco as manufactured by Tremco
 - (d) "SK-1 Structural Sealant" as supplied by Chemlink.

2.2.2 Exterior And Interior Metal To Metal And Metal To Glass Joints:

- .1 One-part Silicone based sealant. Accepted Products:
 - (a) "Spectrum 2" as manufactured by Tremco
 - (b) "Contractors SCS 1000 Sealant" as manufactured by GE Silicones Canada
 - (c) "DC 999-A Silicone Building & Glazing Sealant" as manufactured by DowCorning Canada.

2.3 JOINT BACKING

- 2.3.1 Extruded polyethylene, urethane, neoprene or vinyl foam recommended by sealant Manufacturer. Extruded closed-cell foam, Shore "A" Hardness 20, Tensile Strength of 140-200 Kpa.
- 2.3.2 Circular shape with a diameter 25% greater than the joint width before installation.

2.4 VOID FILLER

- 2.4.1 Glass fibre or Rockwool insulation with a nominal density of 14 kg/m³ (2.86 lbs. / cu. ft.) Sized for 25% compression.

2.5 BOND BREAKER TAPE

- 2.5.1 Pressure sensitive plastic tape which will not bond to sealants. Supplied or recommended by the sealant Manufacturer.

2.6 PRIMER

- 2.6.1 As recommended by the sealant Manufacturer to assure adhesion of the compound and to prevent staining of the substrate.

2.7 CLEANING AGENTS

- 2.7.1 Joint cleaning compounds as recommended by the sealant Manufacturer. Xylol (Xylene), Methyl Ethyl Ketone (MEK) or non-corrosive type compatible with joint forming materials.

PART 3 EXECUTION

3.1 EXAMINATION

- 3.1.1 Inspect existing conditions, and substrates upon which Work of this Section is dependent. Report to the *Consultant* in writing any defects or discrepancies. Commencement of Work implies acceptance of existing conditions and assuming full responsibility for the finished condition of the Work.
- 3.1.2 Verify, before commencing Work, that the joint size, depth and substrate will not adversely affect execution, performance or quality of completed Work; and that the joints can be sealed in an acceptable condition by means of preparation specified in this Section. Verify site conditions together with sealant Manufacturer's representative.
- 3.1.3 Defective Work resulting from application to unsatisfactory joint conditions will be considered the responsibility of those performing the Work of this Section.

3.2 GENERAL

- 3.2.1 Apply in accordance with the Drawings, Specifications and requirements of the jurisdictional authorities and the Canadian Roofing Contractors Association's Roofing Manual.
- 3.2.2 Regard the Manufacturer's printed recommendations and Specifications as a minimum requirement for materials, methods and quality of Work not otherwise specified herein.
- 3.2.3 Make adjustments to the specified procedures caused by weather and site conditions only with the Consultants approval.
- 3.2.4 Conform to the Details.
- 3.2.5 Examine joints before caulking to ensure that the configuration, surface and widths are suitable for the sealant and service, and that the execution of caulking and performance of sealants will not be adversely affected.
- 3.2.6 Verify, before commencing the Work, that the joint size, depth and substrate will not adversely affect the execution, performance or quality of the completed Work; and that joint

can be sealed in an acceptable condition by means of the preparation specified in this Section. Verify the site conditions together with the sealant Manufacturer's representative.

- 3.2.7 Defective Work resulting from the application to unsatisfactory joint conditions will be rejected.

3.3 REMOVAL & PREPARATION

- 3.3.1 Remove the existing sealant and backing material and all deleterious material from the joint. Use the method of surface preparation suitable for substrate that does not damage adjacent surfaces, as recommended by the sealant Manufacturer.
- 3.3.2 Rake out joints, cracks and crevices to receive sealant to a depth measuring half (1/2) the joint width.
- 3.3.3 Brush, scrub, scrape or grind the inner face surfaces to remove loose mortar, dust, oil, grease, oxidation, mill scale, and other materials which will affect the adhesion and integrity of the sealant.
- 3.3.4 Wipe down metal surfaces with clean cellulose sponges or rags soaked in solvent compatible with the sealant, and dry with clean cloths. Ensure solvents do not damage painted surfaces.
- 3.3.5 Ensure that surfaces have not been coated with release agents, coating or other treatments, or that, if present, they are entirely removed.
- 3.3.6 Examine joint sizes and correct to achieve width to depth ratio of 1:2 with joint size no less than 12.7mm (1/2") width and 25.4mm (1") depth.
- 3.3.7 Install joint filler to achieve correct depth, if required.
- 3.3.8 Where necessary to prevent staining, mask adjacent surfaces prior to priming and sealant application.
- 3.3.9 Apply bond breaker tape where required to sealant Manufacturer's printed instructions.

3.4 JOINT DEPTH

- 3.4.1 Provide the following Depth To Width Ratios:
- .1 Masonry:
 - (a) 6.35mm (1/4") deep, up to 12.7mm (1/2") wide
 - (b) 9.53.16mm (3/8") deep, up to 19.05mm (3/4") wide
 - (c) 12.7mm (1/2") deep, up to 25.4mm (1") wide
 - (d) 19.05mm (3/4") deep, up to 50.8mm (2") wide.
 - .2 Non Porous Materials:
 - (a) Joint depth and width to be not be less than 6.35mm (1/4").
 - (b) Maintain a minimum of a 2:1 width to depth ratio or what is listed above in 3.3.1.1 and 3.3.1.2, whichever is more stringent.

3.5 PRIMING

- 3.5.1 Prime the inner face surfaces of joints as necessary for the substrate, in accordance with the sealant Manufacturer's Specification, to provide full adhesion and to prevent staining of the face surface at the joint.
- 3.5.2 Prime surfaces prior to installing the joint backing rod.

3.6 JOINT FILLING AND BACKING

- 3.6.1 Install joint backing where required to maintain the joint depth.

- 3.6.2 Pack joints tightly with sealant in accordance with the Manufacturer's Specifications using pressure guns. Fill joints completely to the required depths with sealant compound. Use sufficient pressure to fill all voids and joints. Sealant is to bond to both sides of the joint.
- 3.6.3 Apply bond breaker tape, prior to applying sealant, where joints are of insufficient size to install backer rod or at 90° junctions or where recommended by the sealant Manufacturer or *Consultant*. Ensure bond surface area meets the minimum required size recommended by the sealant Manufacturer.
- 3.6.4 Mask, with masking tape, all surfaces adjacent to joints which are likely to become coated with sealant during sealant application.
- 3.6.5 Apply sealant using gun dispenser with proper size nozzle for joint to be sealed to leave a weather tight, airtight installation.
- 3.6.6 Fill joints completely to required depths with sealant compound. Use sufficient pressure to fill all voids and joints solid. Sealant shall bond to both sides of the joints but not to backing material. ***Superficial pointing with skin bead is not acceptable.***
- 3.6.7 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets or embedded impurities. Neatly tool surface to create a slightly concave joint.
- 3.6.8 Slope sealant surface at top of surface reglet flashings to create positive water shed.
- 3.6.9 Finish joints smooth, free of wrinkles, ridges, air pockets and imbedded foreign materials. Tool joints to a slight concave surface using a soap/water mixture.
- 3.6.10 Cure sealants in accordance with the sealant Manufacturer's instructions.
- 3.6.11 Do not cover up sealants until proper curing has taken place.
- 3.6.12 Do not allow sealants to cover or spot surfaces outside of joints. Use masking tape on all surfaces adjacent to joints which may become coated with sealant during the caulking process.

3.7 CLEAN UP

- 3.7.1 Remove from surfaces of other work sealant smears, droppings and masking tape immediately after caulking. Use recommended cleaners as required.
- 3.7.2 Clean surfaces soiled by Work of this Section. Do not use chemicals, scrapers, or other tools in cleaning which will damage surfaces. Make good other Work.
- 3.7.3 Clean up and remove from the job site on a daily basis, all rubbish and surplus materials resulting from this Work.
- 3.7.4 Joint sealants shall be protected from physical damage and the elements until such time as the sealant will not be affected by same.

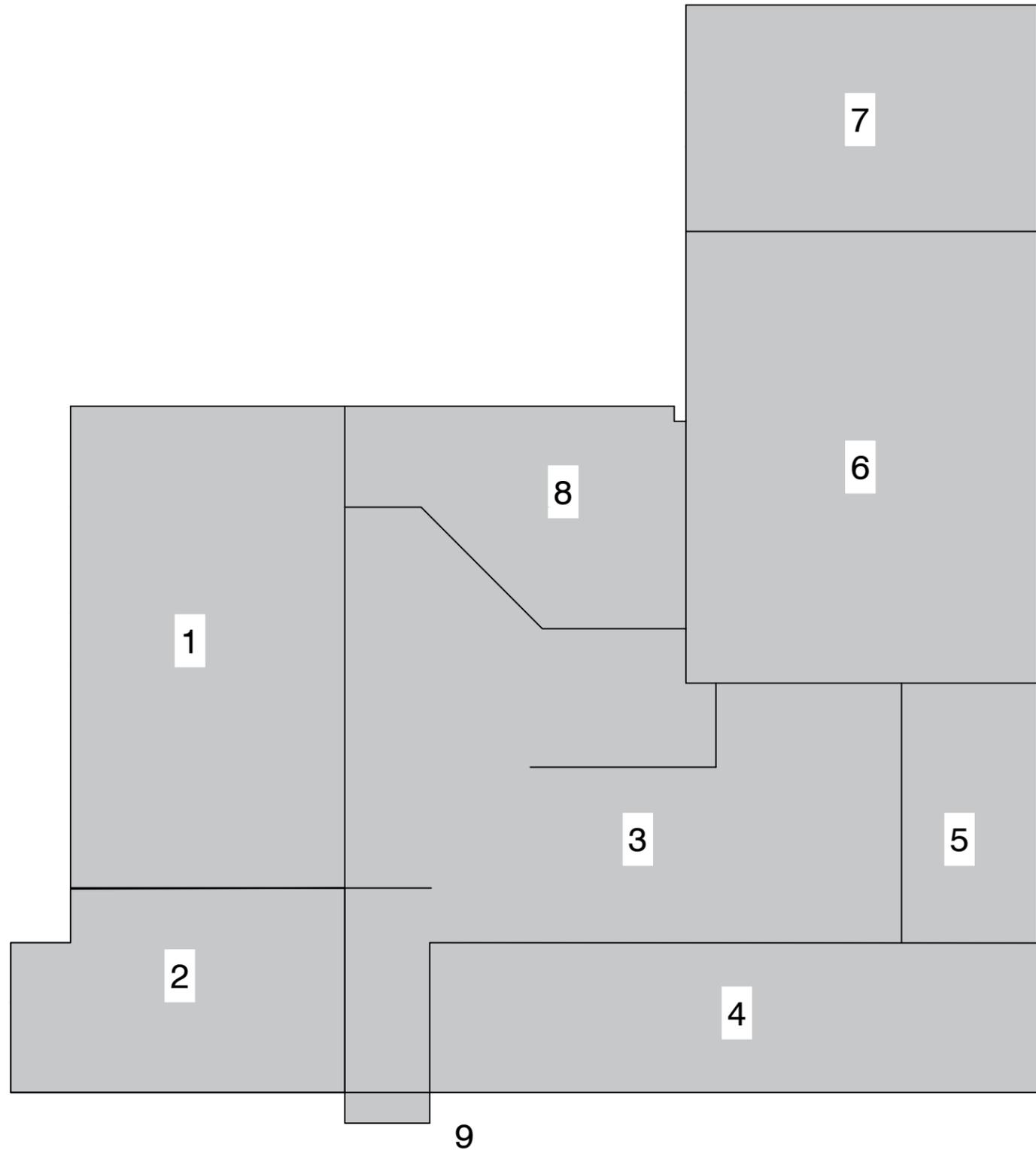
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SCHEDULE A – LIST OF PLANS & DETAILS

Dwg #	Drawing Title	Issued/Revised	Date
1	Roof Plan	For BID	January 2025
2	Perimeter Detail	For BID	January 2025
3A	Curb Detail	For BID	January 2025
3B	Mechanical Curb Detail	For BID	January 2025
4	Drain Detail	For BID	January 2025
5	Soil Stack Detail	For BID	January 2025
6	Furnace Stack Detail	For BID	January 2025
7	Pitch Pan Detail	For BID	January 2025
8	Sleeper/Separation Curb Detail	For BID	January 2025
9	Scupper Detail	For BID	January 2025
10	Masonry Wall Detail	For BID	January 2025
11	Metal Siding Detail	For BID	January 2025
12	Perimeter Detail	For BID	January 2025
13	Drain Detail	For BID	January 2025
14	Masonry Wall Detail	For BID	January 2025
15	Metal Siding Detail	For BID	January 2025

END OF LIST OF PLANS AND DETAILS

2025 ROOF REPLACEMENT PROJECT
ROOF AREAS 1, 2, 3, 4, 5, 6, 7, 8 & 9



RETURNING COMPOSITIONS

ROOF AREAS 1, 2, 3, 4, 5, 6 & 7
 1-PLY GRANULATED CAP SHEET
 1-PLY BASE SHEET
 0.5" FIBREBOARD OVERLAY
 TAPERED INSULATION
 2.5" POLYISOCYANURATE
 2.5" POLYISOCYANURATE
 BASE SHEET VAPOUR BARRIER
 VAPOUR BARRIER (EXISTING)
 0.5" GYPSUM BOARDS (EXISTING)
 CONCRETE DECK (EXISTING)

ROOF AREAS 8 & 9
 1-PLY GRANULATED CAP SHEET
 1-PLY BASE SHEET
 0.5" FIBREBOARD OVERLAY
 TAPERED BACKSLOPE
 2" POLYISOCYANURATE
 BASE SHEET VAPOUR BARRIER
 VAPOUR BARRIER (EXISTING)
 0.5" GYPSUM BOARDS METAL DECK
 (EXISTING)



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 ROOF & BUILDING ENVELOPE CONSULTANTS

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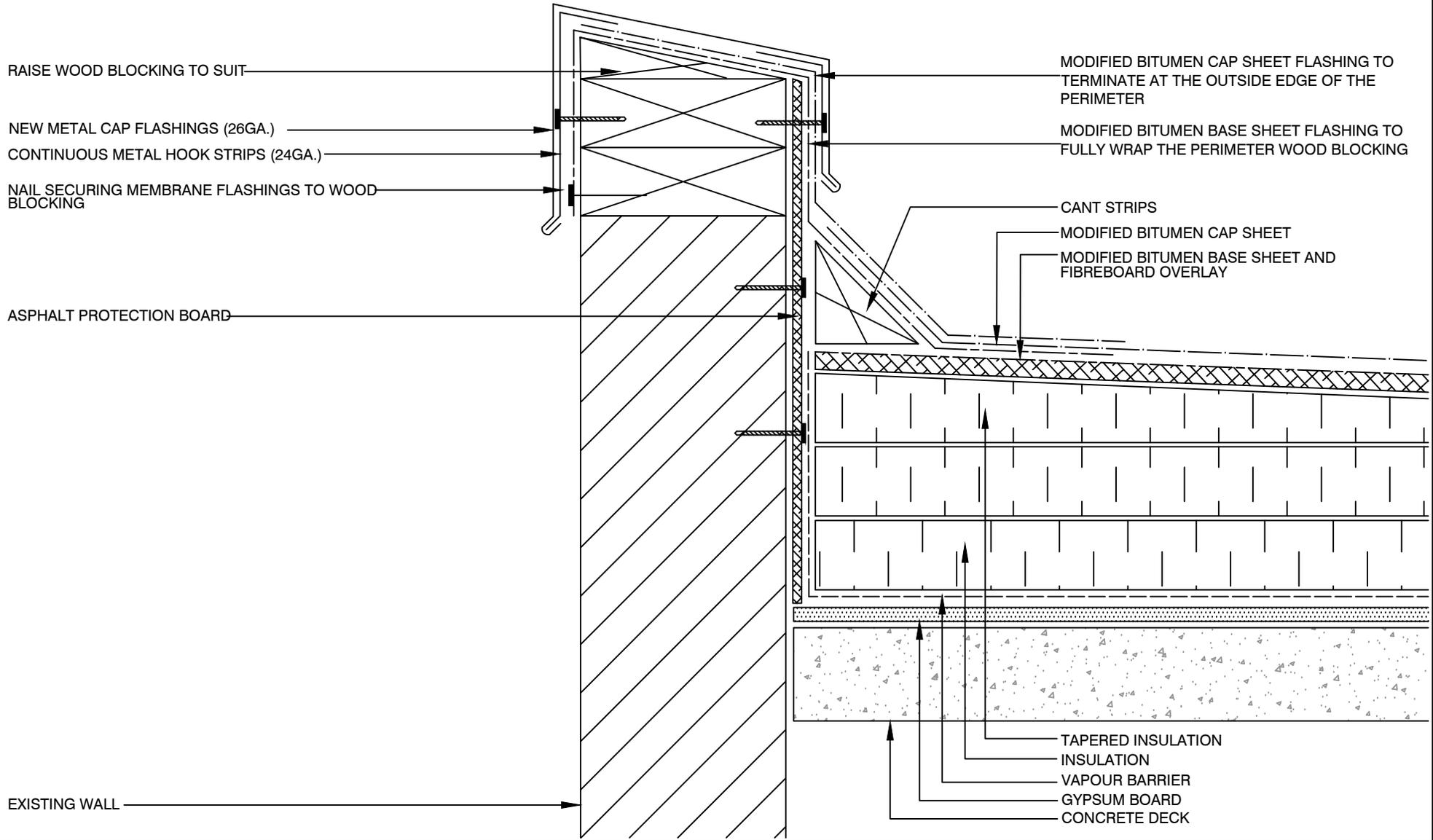
CLIENT
 HOSSACK & ASSOCIATES

PROJECT ADDRESS/NAME
 ASCENSION CES
 5205 NEW ST., BURLINGTON, ON

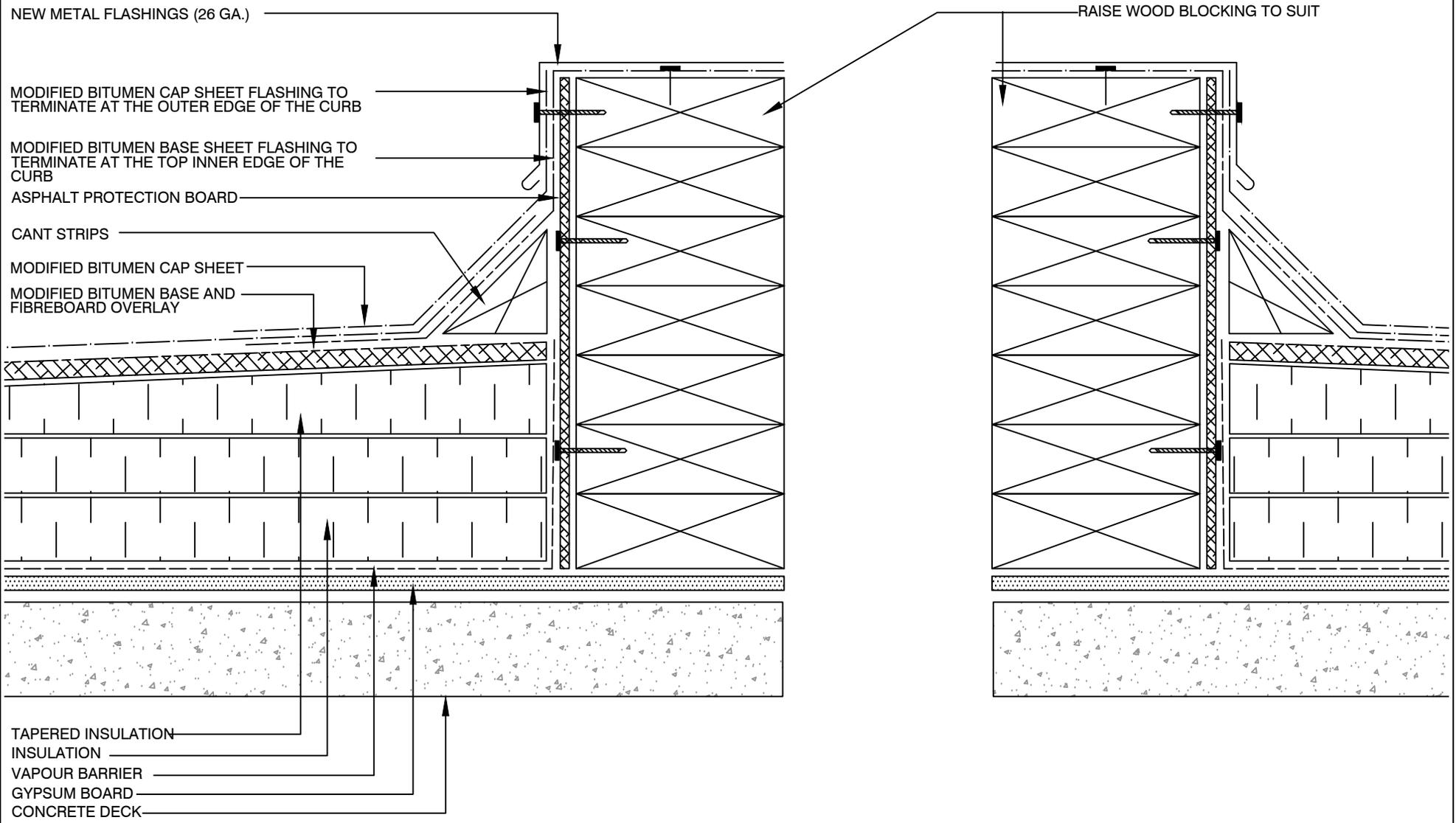
DRAWING TITLE
 ROOF PLAN

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DRAWING TITLE
WOOD CURB DETAIL

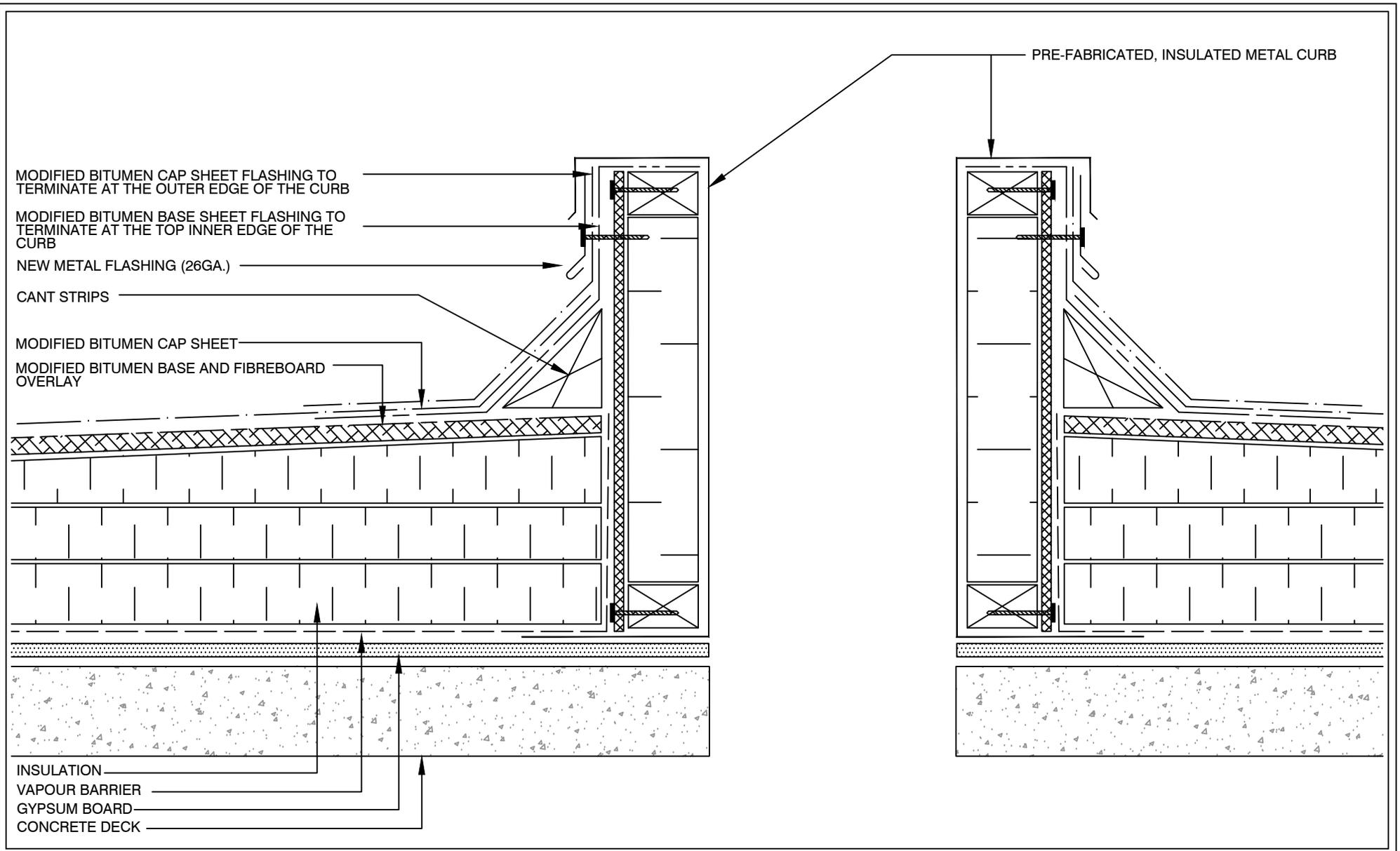
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MECHANICAL CURB DETAIL

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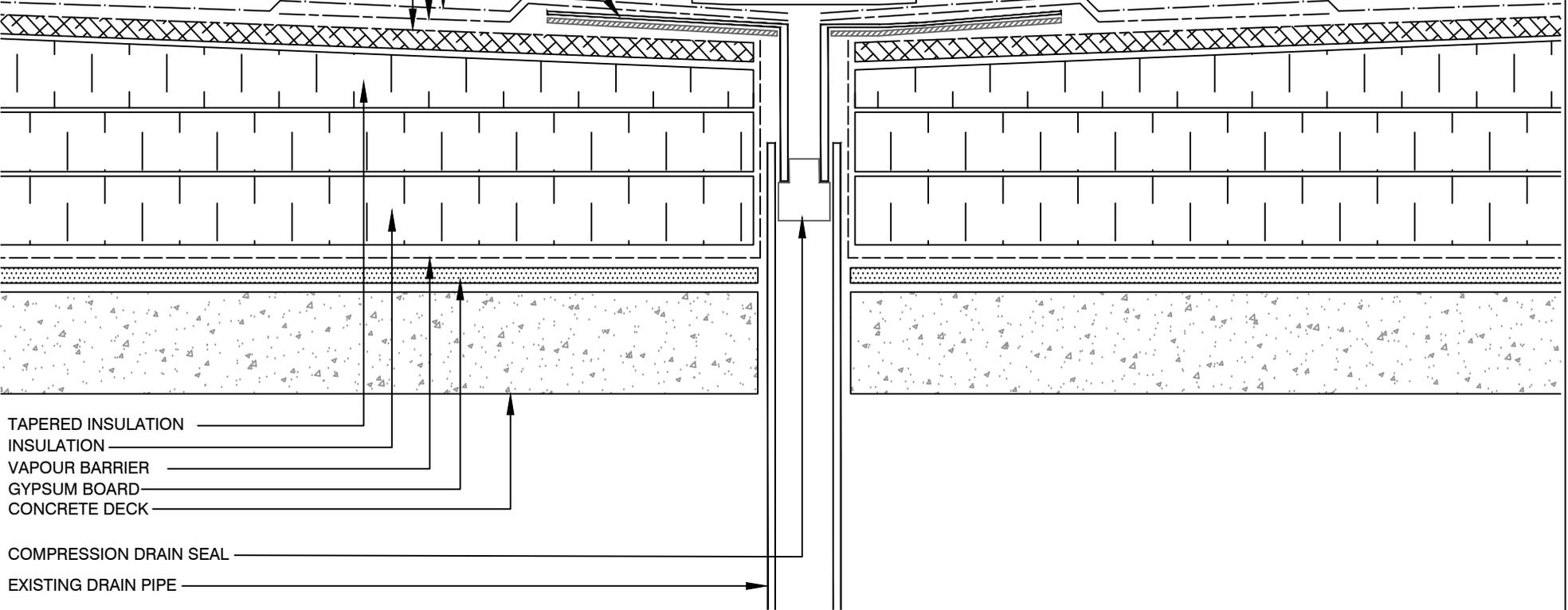
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PRIMED DRAIN FLANGE TO BE SET IN A FULL
BED OF MASTIC

MODIFIED BITUMEN CAP SHEET
MODIFIED BITUMEN BASE SHEET FLASHING
MODIFIED BITUMEN BASE SHEET PRE-LAMINATED
TO OVERLAY BOARD

METAL DRAIN SCREEN

CLAMPING RING



TAPERED INSULATION
INSULATION
VAPOUR BARRIER
GYPSUM BOARD
CONCRETE DECK

COMPRESSION DRAIN SEAL
EXISTING DRAIN PIPE



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EXTEND SOIL STACK PIPE TO THE TOP OF THE
STACK EXTENSION

CAP TO BE MECHANICALLY SECURED IN PLACE

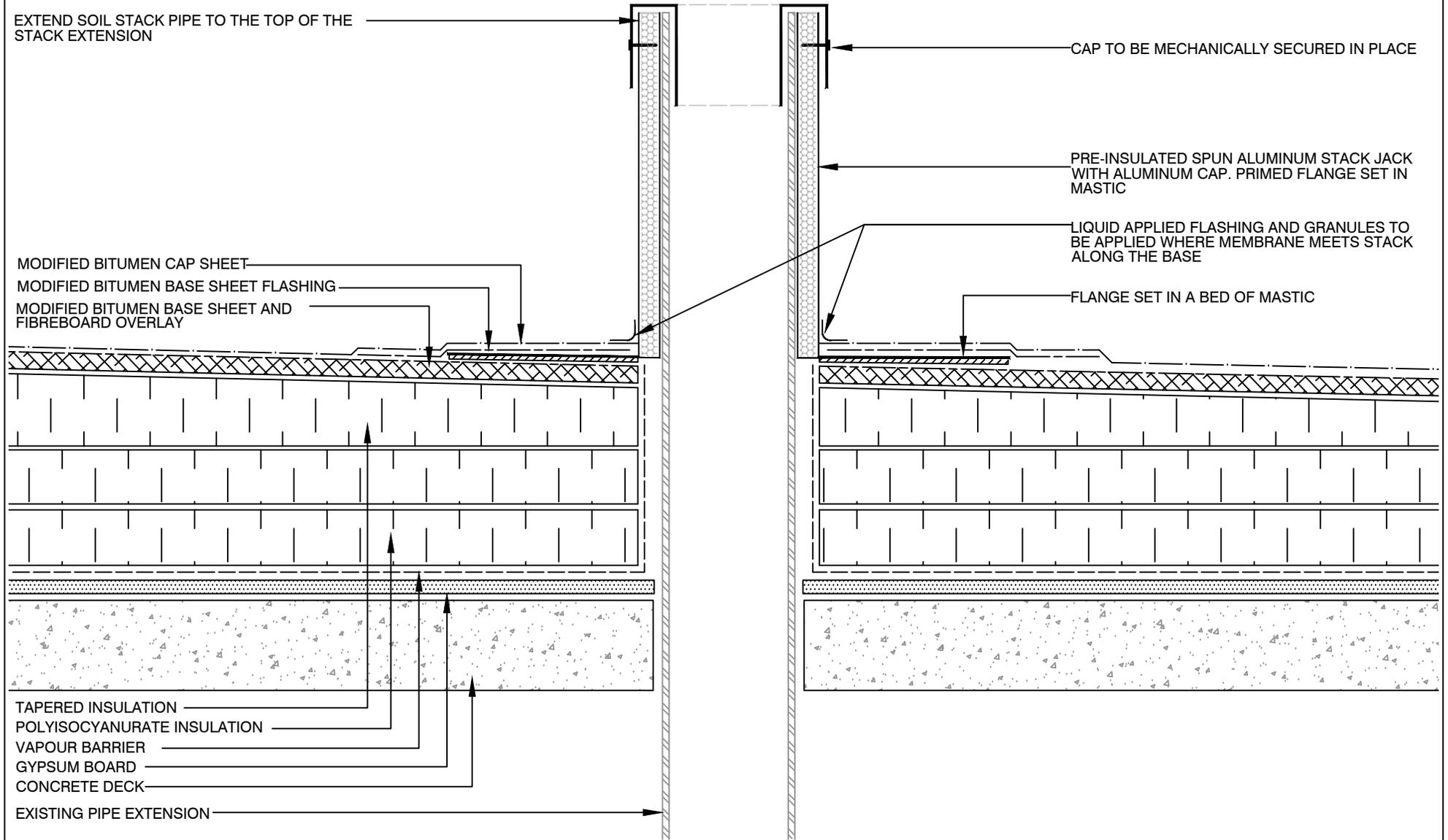
MODIFIED BITUMEN CAP SHEET
MODIFIED BITUMEN BASE SHEET FLASHING
MODIFIED BITUMEN BASE SHEET AND
FIBREBOARD OVERLAY

PRE-INSULATED SPUN ALUMINUM STACK JACK
WITH ALUMINUM CAP. PRIMED FLANGE SET IN
MASTIC

LIQUID APPLIED FLASHING AND GRANULES TO
BE APPLIED WHERE MEMBRANE MEETS STACK
ALONG THE BASE

FLANGE SET IN A BED OF MASTIC

TAPERED INSULATION
POLYISOCYANURATE INSULATION
VAPOUR BARRIER
GYPSUM BOARD
CONCRETE DECK
EXISTING PIPE EXTENSION

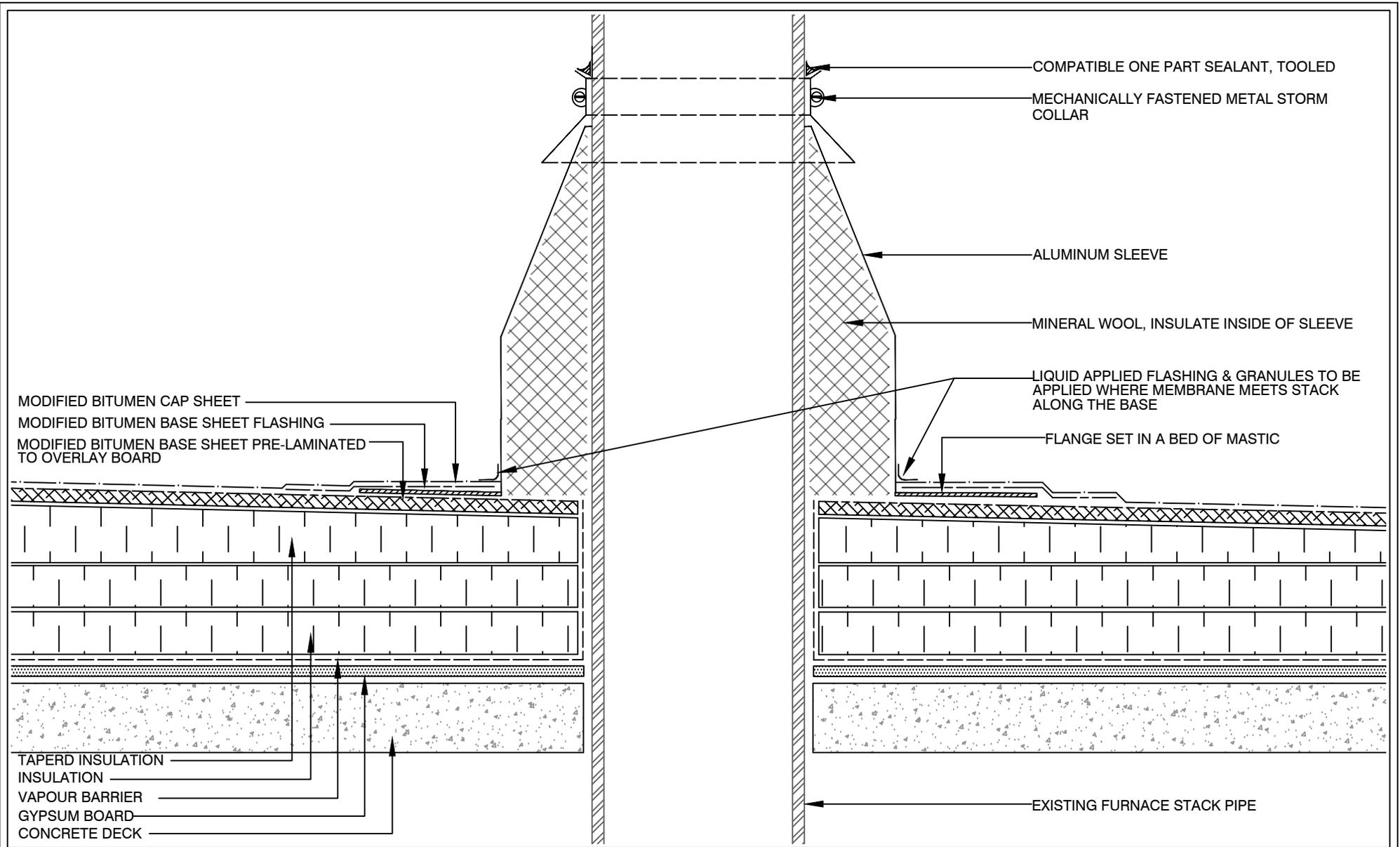



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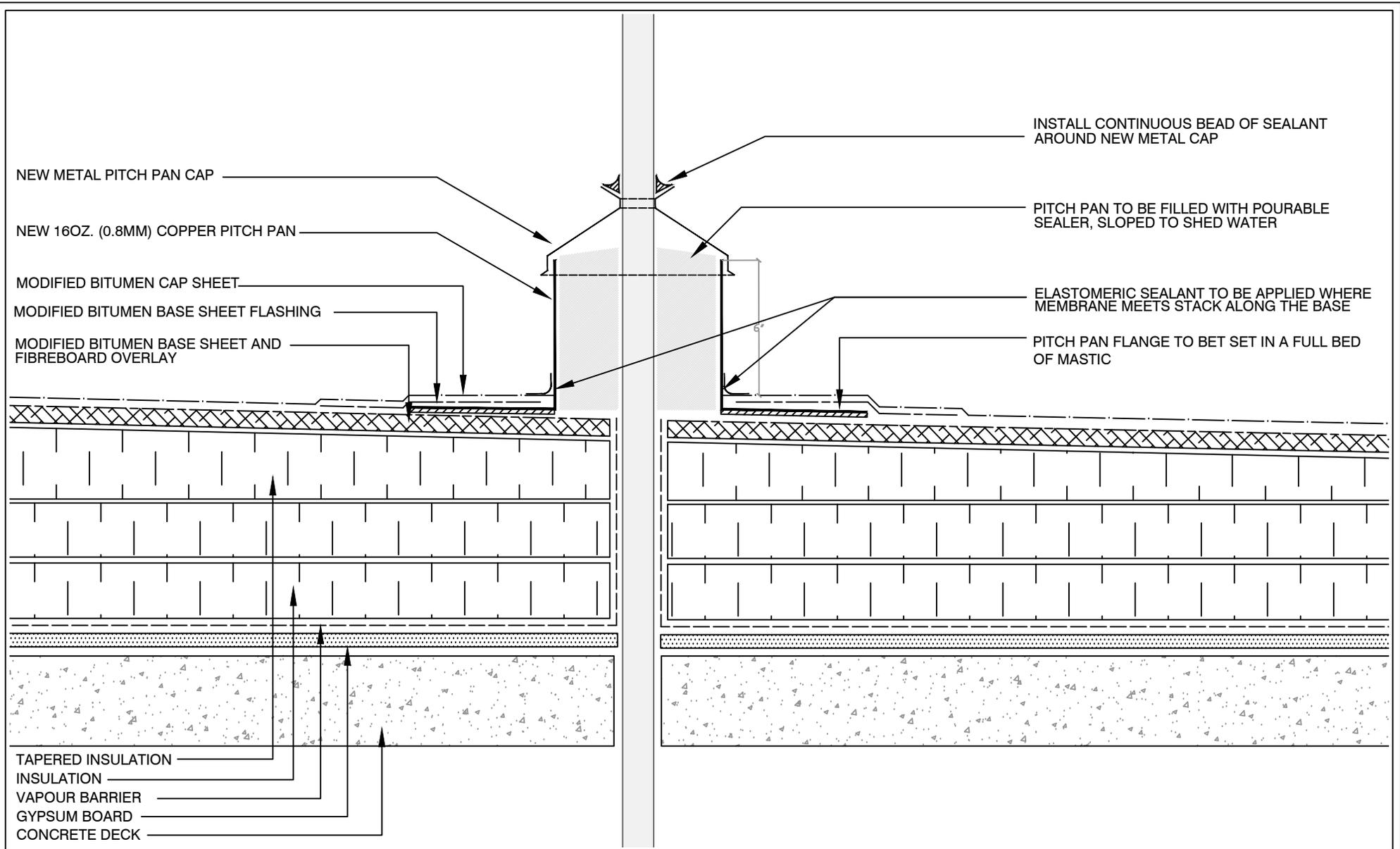
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 DRAWING TITLE
SOIL STACK DETAIL

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73 INDUSTRIAL PARKWAY NORTH - UNIT #3 AURORA - ONTARIO - L4G 4C4 TEL (905) 503-1300 - FAX (905) 503-2002	DRAWING TITLE FURNACE STACK DETAIL	THIS DRAWING IS THE PROPERTY OF TRI-TECH PINNACLE GROUP INC. AND MAY NOT BE REPRODUCED WITHOUT CONSENT		



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73 INDUSTRIAL PARKWAY NORTH - UNIT #3 AURORA - ONTARIO - L4G 4C4 TEL (905) 503-1300 - FAX (905) 503-2002	DRAWING TITLE	PITCH PAN DETAIL		THIS DRAWING IS THE PROPERTY OF TRI-TECH PINNACLE GROUP INC. AND MAY NOT BE REPRODUCED WITHOUT CONSENT				

MODIFIED BITUMEN (BASE & CAP) MEMBRANE
FLASHINGS TO EXTEND OVER TOP OF SLEEPER

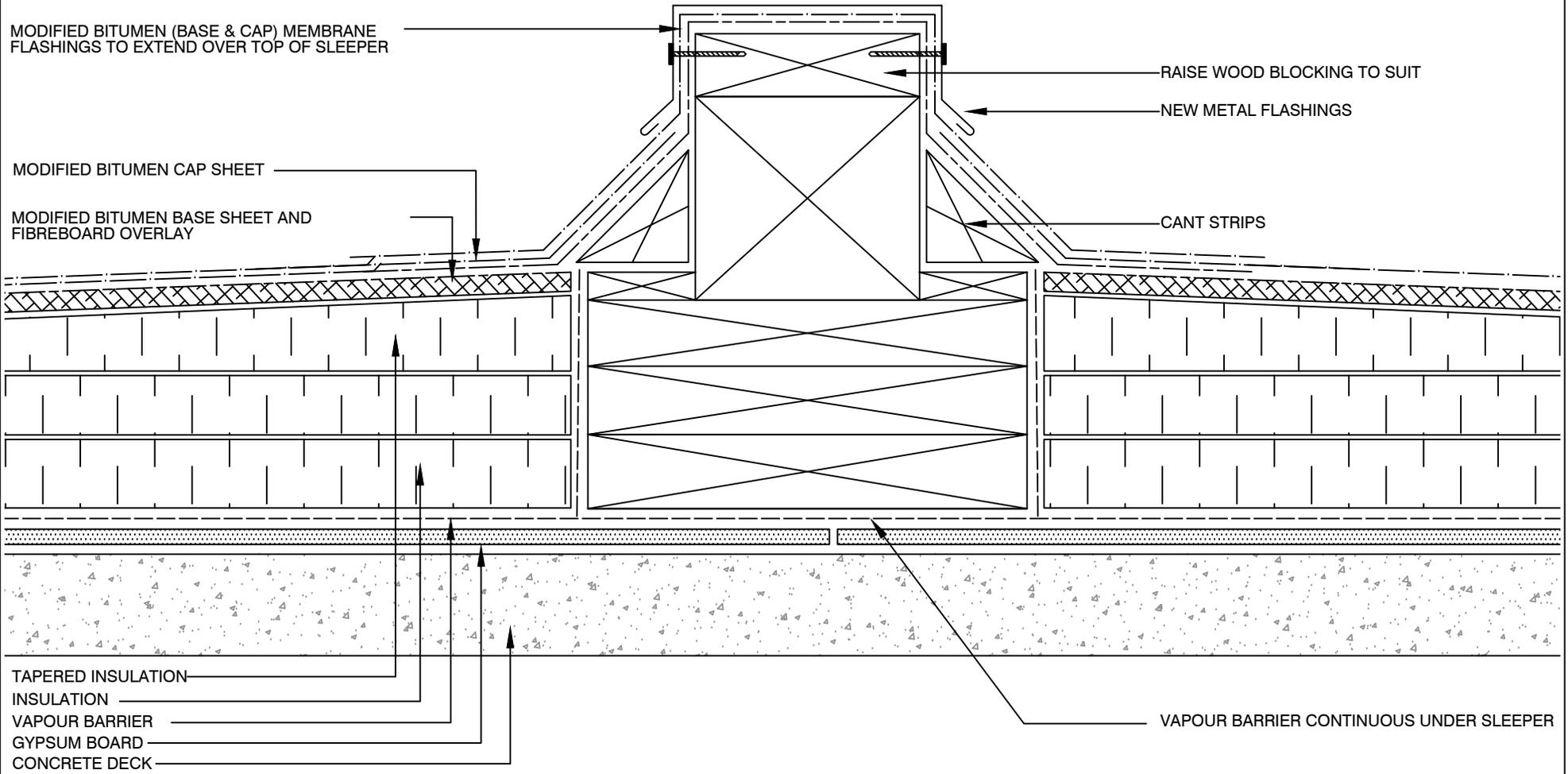
RAISE WOOD BLOCKING TO SUIT

NEW METAL FLASHINGS

MODIFIED BITUMEN CAP SHEET

CANT STRIPS

MODIFIED BITUMEN BASE SHEET AND
FIBREBOARD OVERLAY



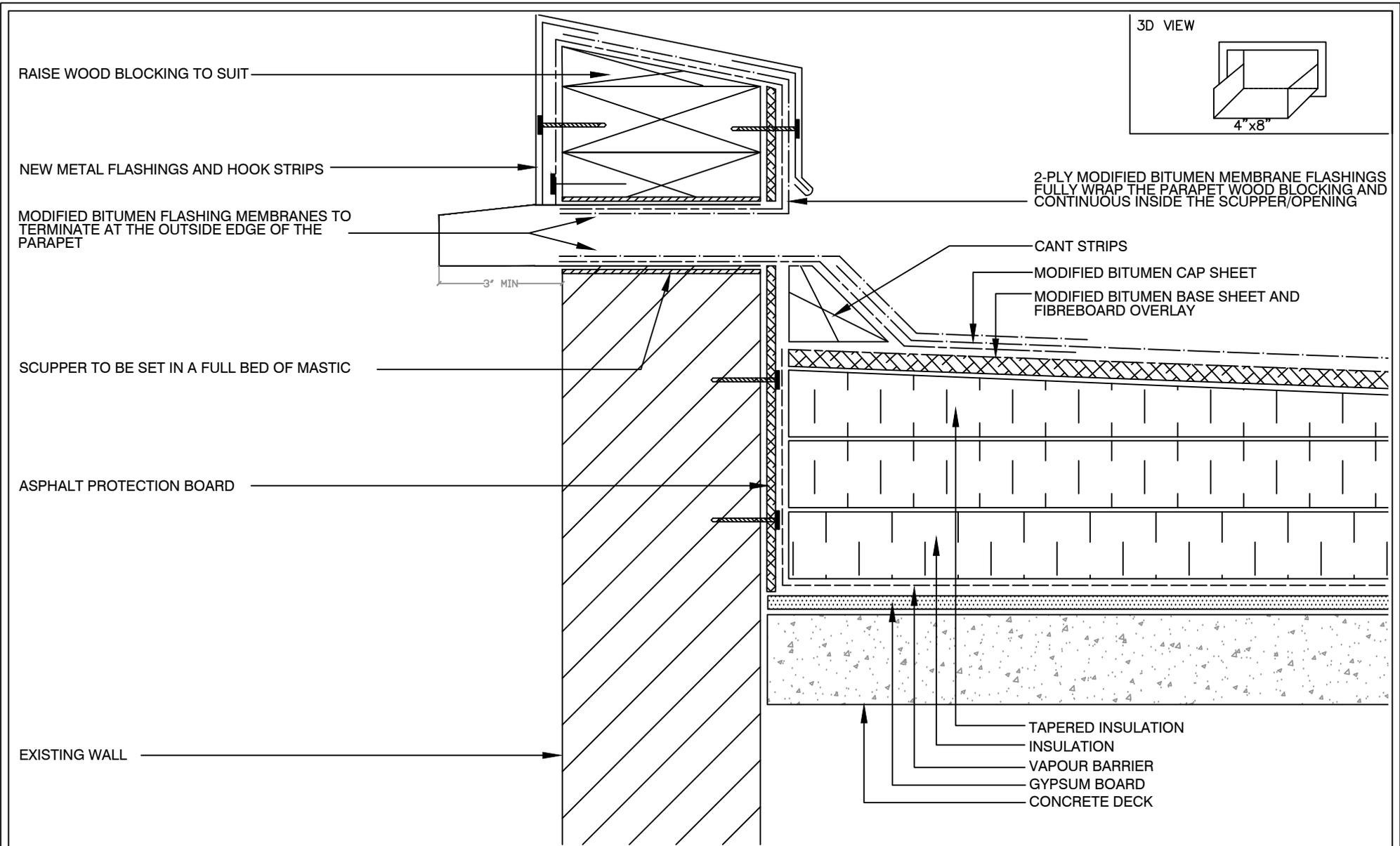
TAPERED INSULATION
INSULATION
VAPOUR BARRIER
GYPSUM BOARD
CONCRETE DECK

VAPOUR BARRIER CONTINUOUS UNDER SLEEPER

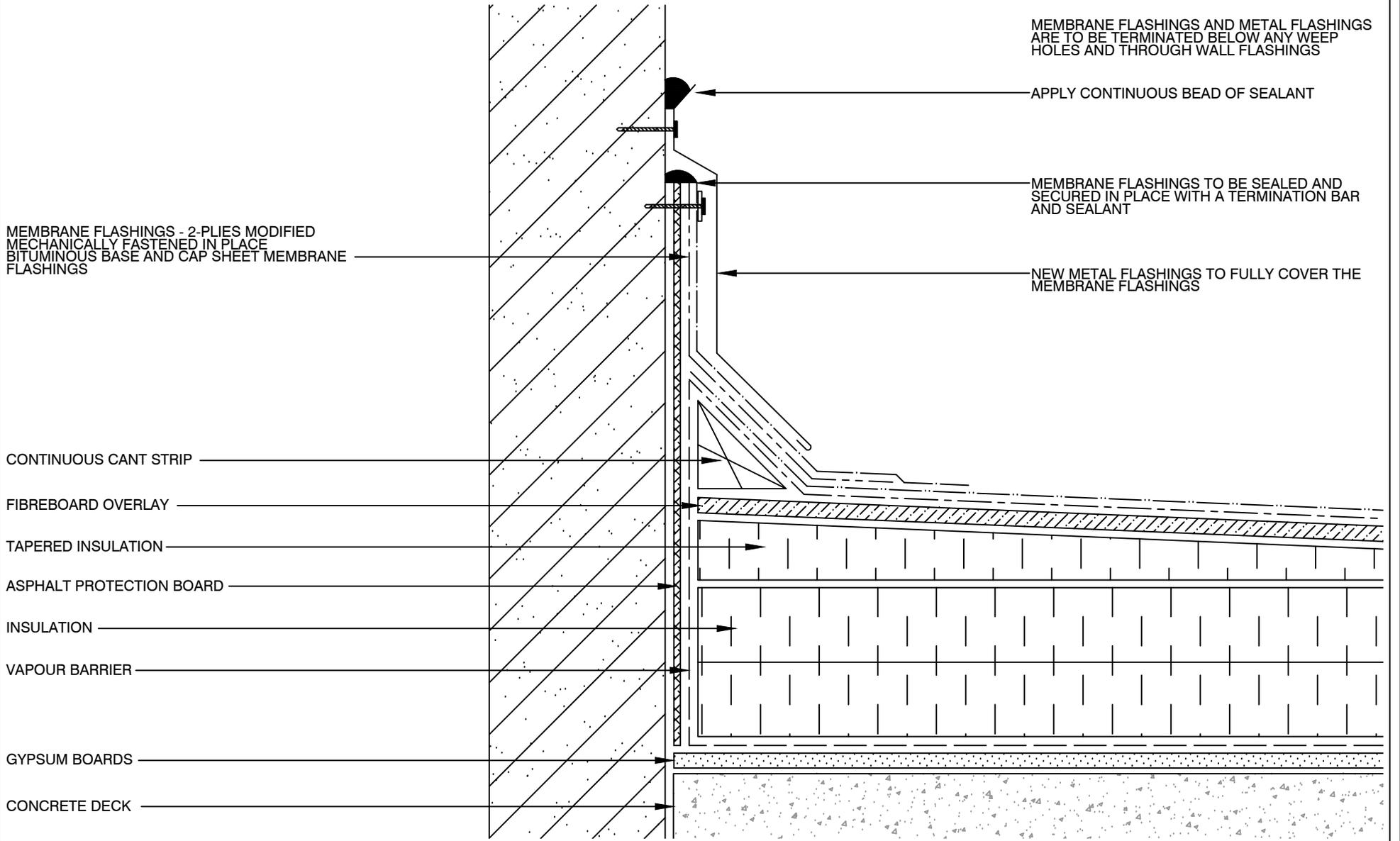


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	<p>PROJECT ADDRESS</p> <p>ASCENSION CES 5205 NEW ST., BURLINGTON, ON</p>	<p>DATE</p> <p>JANUARY 2025</p>		
<p>73 INDUSTRIAL PARKWAY NORTH - UNIT #3 AURORA - ONTARIO - L4G 4C4 TEL (905) 503-1300 - FAX (905) 503-2002</p>	<p>DRAWING TITLE</p> <p>SCUPPER DETAIL</p>	<p>THIS DRAWING IS THE PROPERTY OF TRI-TECH PINNACLE GROUP INC. AND MAY NOT BE REPRODUCED WITHOUT CONSENT</p>		



MEMBRANE FLASHINGS - 2-PLIES MODIFIED MECHANICALLY FASTENED IN PLACE BITUMINOUS BASE AND CAP SHEET MEMBRANE FLASHINGS

MEMBRANE FLASHINGS AND METAL FLASHINGS ARE TO BE TERMINATED BELOW ANY WEEP HOLES AND THROUGH WALL FLASHINGS

APPLY CONTINUOUS BEAD OF SEALANT

MEMBRANE FLASHINGS TO BE SEALED AND SECURED IN PLACE WITH A TERMINATION BAR AND SEALANT

NEW METAL FLASHINGS TO FULLY COVER THE MEMBRANE FLASHINGS

CONTINUOUS CANT STRIP

FIBREBOARD OVERLAY

TAPERED INSULATION

ASPHALT PROTECTION BOARD

INSULATION

VAPOUR BARRIER

GYPSUM BOARDS

CONCRETE DECK

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DRAWING TITLE
MASONRY WALL DETAIL

FILE NO.
24-1323

SCALE
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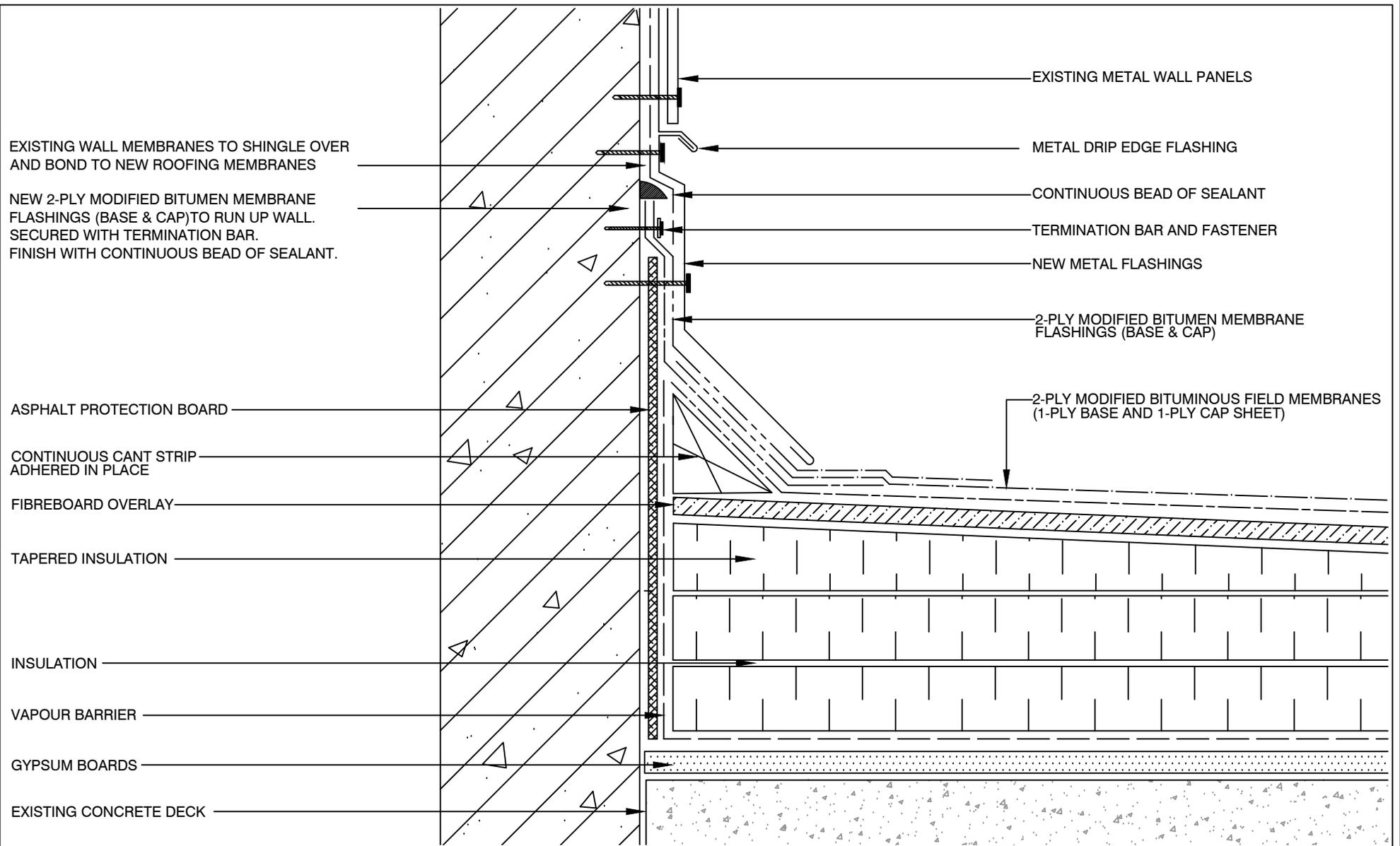
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JANUARY 2025

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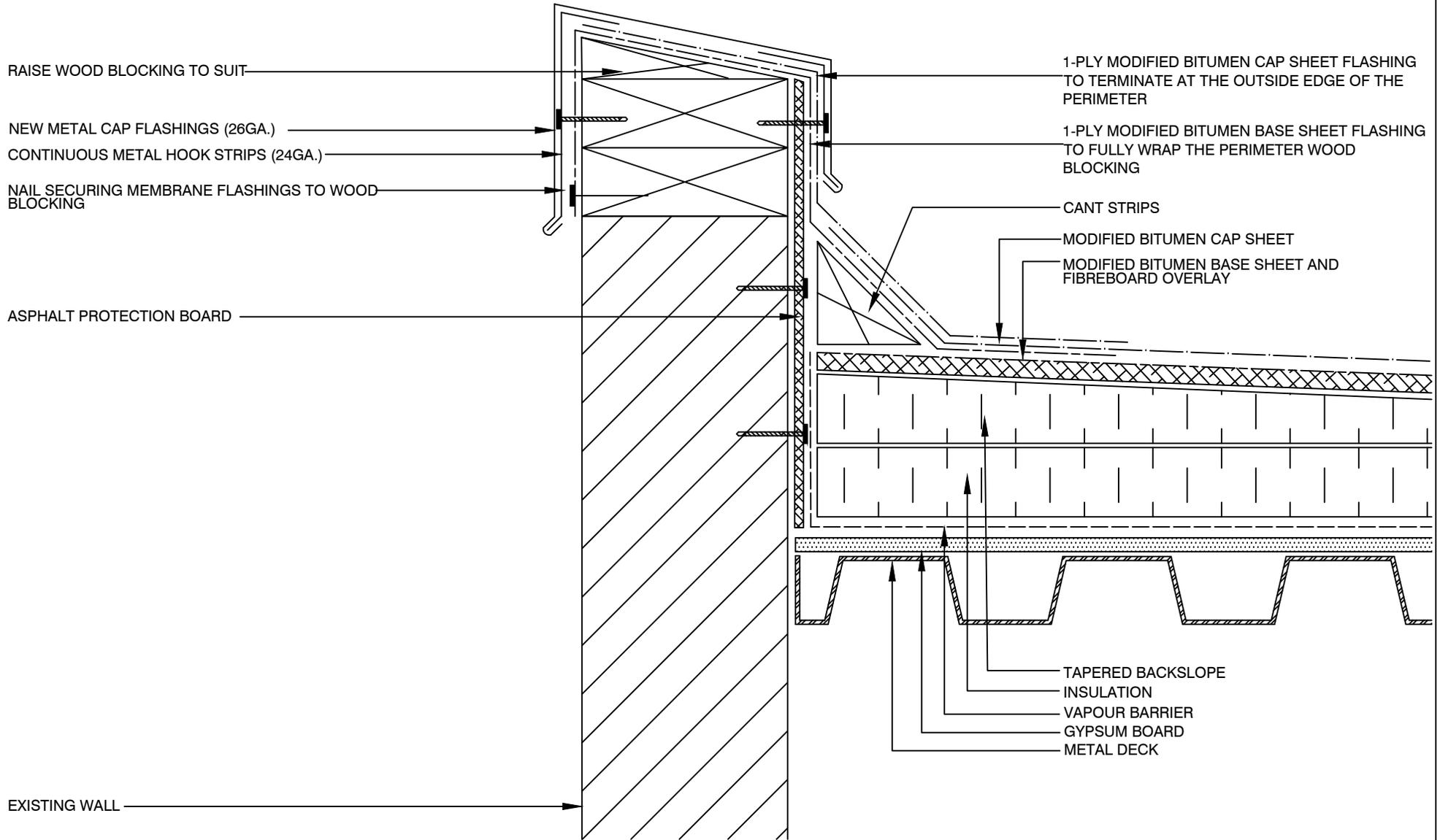

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	PROJECT ADDRESS ASCENSION CES 5205 NEW ST., BURLINGTON, ON	DATE JANUARY 2025		
73 INDUSTRIAL PARKWAY NORTH - UNIT #3 AURORA - ONTARIO - L4G 4C4 TEL (905) 503-1300 - FAX (905) 503-2002	DRAWING TITLE METAL WALL DETAIL	THIS DRAWING IS THE PROPERTY OF TRI-TECH PINNACLE GROUP INC. AND MAY NOT BE REPRODUCED WITHOUT CONSENT		



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PERIMETER DETAIL

FILE NO.

24-1323

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N.T.S.

DATE

JANUARY 2025

DRAWING NUMBER

12

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PRIMED DRAIN FLANGE TO BE SET IN A FULL
BED OF MASTIC

MODIFIED BITUMEN CAP SHEET
MODIFIED BITUMEN BASE SHEET FLASHING
MODIFIED BITUMEN BASE SHEET AND
FIBREBOARD OVERLAY

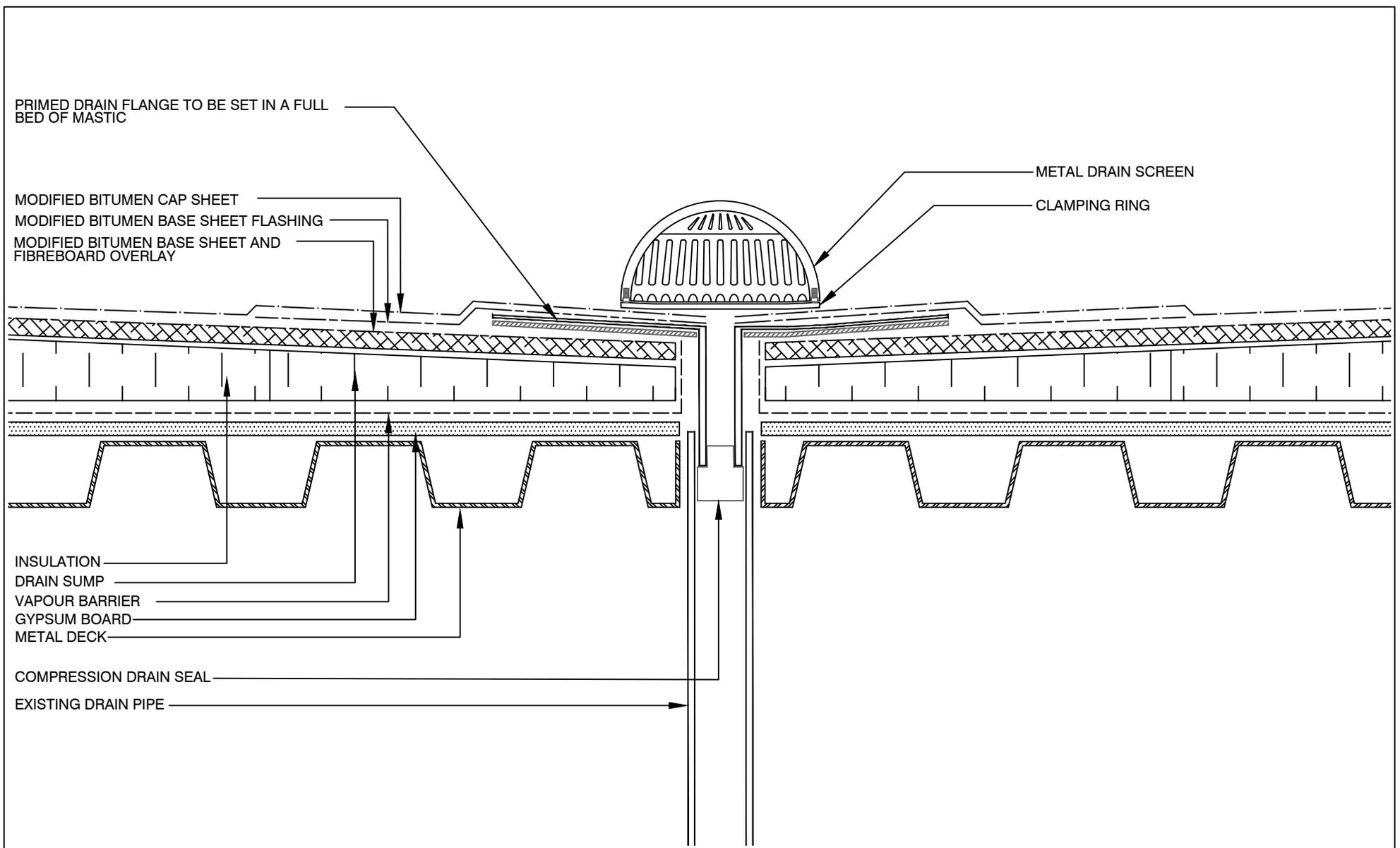
METAL DRAIN SCREEN

CLAMPING RING

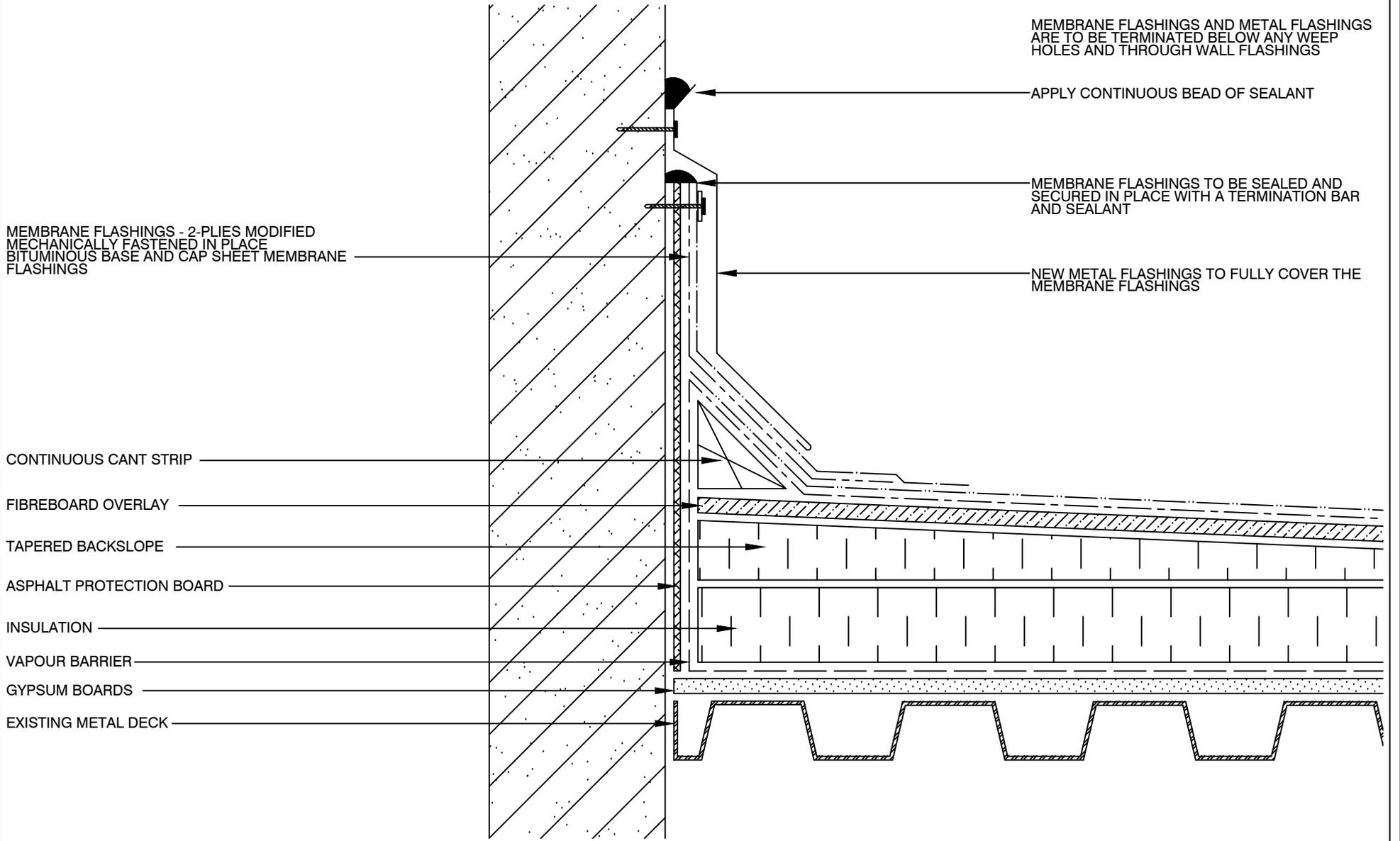
INSULATION
DRAIN SUMP
VAPOUR BARRIER
GYPSUM BOARD
METAL DECK

COMPRESSION DRAIN SEAL

EXISTING DRAIN PIPE



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	PROJECT ADDRESS	ASCENSION CES 5205 NEW ST., BURLINGTON, ON	DATE	JANUARY 2025			
73 INDUSTRIAL PARKWAY NORTH - UNIT #3 AURORA - ONTARIO - L4G 4C4 TEL (905) 503-1300 - FAX (905) 503-2002	DRAWING TITLE	DRAIN DETAIL		THIS DRAWING IS THE PROPERTY OF TRI-TECH PINNACLE GROUP INC. AND MAY NOT BE REPRODUCED WITHOUT CONSENT			

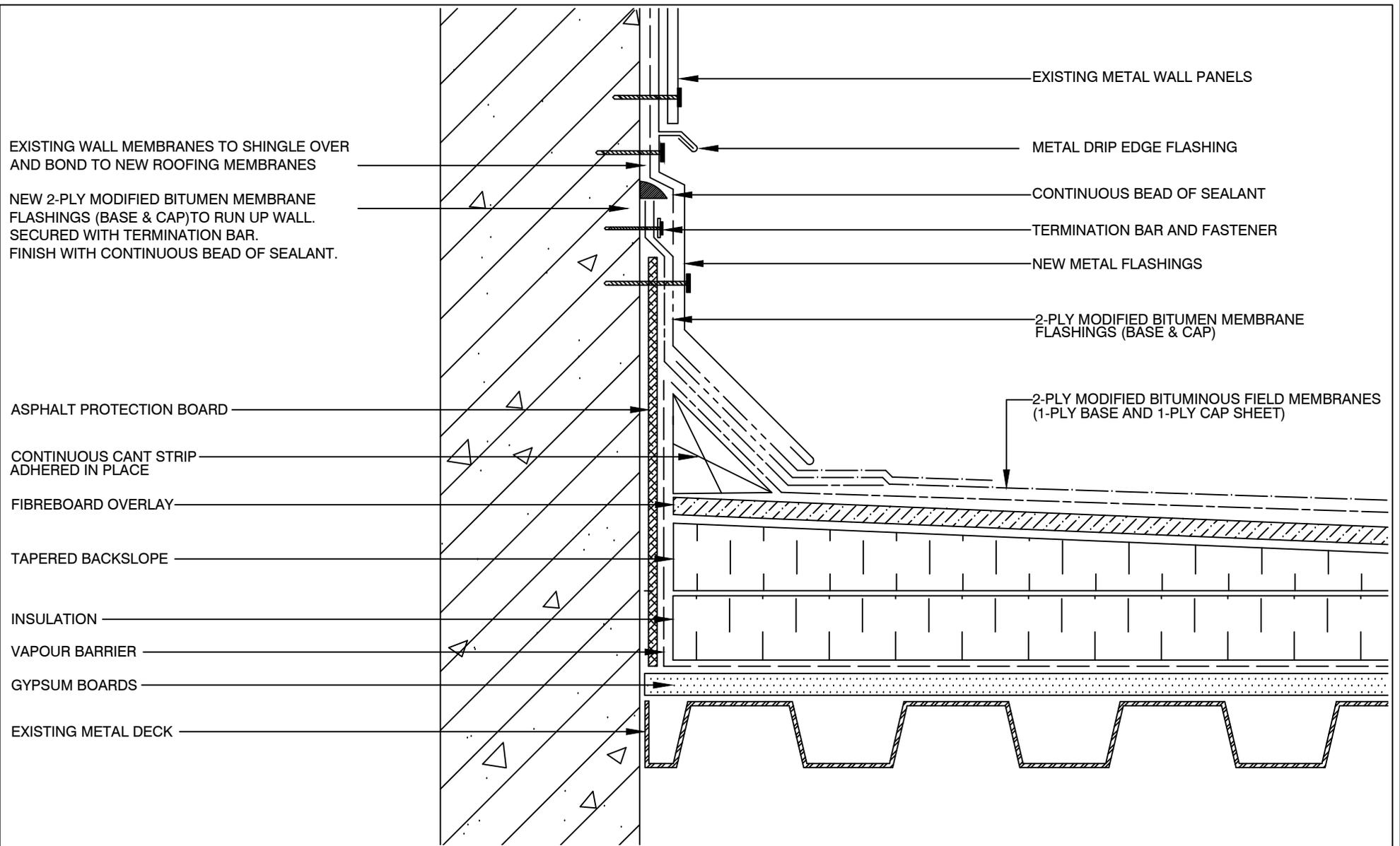



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**ASCENSION CES
 5205 NEW ST., BURLINGTON, ON**
 DRAWING TITLE
MASONRY WALL DETAIL

FILE NO.
24-1323
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N.T.S.
 DATE
JANUARY 2025
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DRAWING NUMBER
14



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	<p>PROJECT ADDRESS ASCENSION CES 5205 NEW ST., BURLINGTON, ON</p>	<p>DATE JANUARY 2025</p>		
<p>73 INDUSTRIAL PARKWAY NORTH - UNIT #3 AURORA - ONTARIO - L4G 4C4 TEL (905) 503-1300 - FAX (905) 503-2002</p>	<p>DRAWING TITLE METAL WALL DETAIL</p>	<p>THIS DRAWING IS THE PROPERTY OF TRI-TECH PINNACLE GROUP INC. AND MAY NOT BE REPRODUCED WITHOUT CONSENT</p>		

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 07 27 10 – Air Barriers.
- .3 Section 07 21 13 – Board Insulation.
- .4 Section 05 50 00 - Metal Fabrications.
- .5 Section 07 44 56 – Composite Panels.

1.2 REFERENCES

- .1 American Association (AA)
 - .1 DAF-45-[03], Designation System for Aluminium Finishes.
- .2 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
- .3 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A653/A653M-[02a], Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM A792/A792M-[02], Specification for Steel Sheet, 55% Aluminium-Zinc Alloy-Coated by the Hot-Dip Process.
 - .3 ASTM D523-[89(1999)], Test Method for Specular Gloss.
 - .4 ASTM D822-[01], Standard Practice, For Conducting Test on Paint and Related Coatings and Materials Using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.
 - .5 ASTM D2832-[92 (1999)], Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-93.1-[M85], Sheet, Aluminium Alloy, Prefinished, Residential.
- .5 Canadian Standards Association (CSA International)
 - .1 CSA S136-[01], North American Specification for the Design of Cold-Formed Steel Structural Members.
 - .2 CSA S136.1-[01], Commentary on North American Specification for the Design of Cold-Formed Steel Structural Members.
- .6 Environmental Choice Program (ECP)
 - .1 CCD-016-[97], Thermal Insulation.
 - .2 CCD-046[95], Adhesives.
 - .3 CCD-046-[95], Sealants and Caulking Compounds.

1.3 SYSTEM DESCRIPTION

- .1 Design Requirements:
- .2 Design, fabricate and erect a pressure equalized wall panel system to meet the following requirements:
 - .1 Rain Penetration: prevent rain penetration through wall system. Design system based on "Rain Screen Principle" per the National Research Council. Incorporate means of draining to the exterior.
 - .2 Wind load: Design wall system to resist wind loads, positive and negative, expected in this geographical region (OBC climatic data, 100 years probability) without causing rattling, vibration or excessive deflection of panels, overstressing of fasteners, clips and other detrimental effects on system.
 - .3 Structural and thermal movement: Accommodate movement of supporting structural framing and movement caused by thermal expansion and contraction of system component parts without causing bowing, buckling, delamination, oil canning, failure of joint seals, excessive stress on fasteners or any other detrimental effects.
- .3 Panel flatness tolerance: Fabricate panels not exceeding the following tolerances:
 - .1 Rises and falls across the panel, (local bumps and depressions) will not be accepted.
 - .2 1.5 mm in a concave/ convex direction, measured perpendicular to the normal plane.
- .4 Panel removal: System/ procedure to allow removal of individual panels within wall system.
- .5 Maximum deviation from vertical and horizontal alignment of erected panels: 6 mm in 6 m.
- .6 Testing: Provide wall assembly that has been tested and certified to conform to the following criteria:
 - .1 Structural: Provide systems that have been tested in accordance with ASTM E330 at a design pressure of 60 psf and have been certified to be without permanent deformation or failures of structural members.

1.4 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Indicate elevations, profiles, dimensions and thickness of panels and joint details.
 - .3 Indicate attachment clips, system extrusions, fastening, anchor and installation details.

- .3 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit duplicate 130 x 180 mm samples of wall system, representative of materials, finishes and colours.
- .4 Production and Installation Schedule:
 - .1 Meeting the required schedules listed below will be required for approval of progress payments for design and fabrication.
 - .2 As part of base contract price, upon award of contract submit a detailed schedule with the shop drawing which outlines:
 - .1 submission timing of shop drawings
 - .2 fabrication timing from date of approved shop drawings
 - .3 building completion requirements for site measurements
 - .4 Duration of installation period
 - .5 dates required for installation program for work to be 100% complete by date of substantial completion
 - .3 Ensure the program for fabrication and installation is integrated into the General Contractor's overall project schedule.
 - .4 As part of base contract price, attend site meetings commencing 6 weeks prior to installation and through installation period to confirm site progress and timing of completion.
- .5 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.5 MAINTENANCE DATA

- .1 Provide maintenance data for cleaning and maintenance of aluminum finishes for incorporation into manual.
- .2 Protect panel face with a plastic film adhered to panel in accordance with panel manufacturer's recommendation.
- .3 Store components and materials in accordance with panel manufacturer's recommendations.

1.6 MOCK UP

- .1 Submit mock-up in accordance with Section 013330- Submittal Procedures.
- .2 Erect mock-up panel approximately 3m long x 2m high in location as directed by architect.
- .3 Mock-up panel shall include all components of the wall system including subgirt flashing. Mock up will NOT be incorporated into work once approved.
- .4 Remove mock up from site following installation and acceptance of panel system.

1.7 DURANAR PANEL FINISH WARRANTY

- .1 Provide a manufacturer's written warranty: Furnish panel manufacturer's written warranty covering failure of factory-applied exterior finish on composite metal panels within the warranty period; warrant finish per ASTM D 4214 for chalk not in excess of 8 NBS units and fade not in excess of 5 NBS units. Warranty period for finish: 10 years after the date of Substantial Completion.

1.8 QUALITY ASSURANCE

- .1 Installation crews engaged or provided by the approved supplier shall have proven experience specifically trained and qualified in this work (written proof of minimum of five (5) years employment or service with the panel manufacturer or similar manufacturer. Individuals are to be either employees of the manufacturer and/or workers approved by the manufacturer.
- .2 Provide one (1) thoroughly experienced, reliable, qualified and competent foreman in charge of the work to be on site at all times when work is taking place. Individual to be designated in charge from start of activities on site until final deficiencies are complete. Foreman may only be changed by written approval *or request* of the Consultant or owner.
- .3 Panel fabricator/supplier is to have adequate plant and skilled tradesmen and is known to have manufactured and installed panel systems for a minimum of five (5) years in the Province of Ontario

1.9 MATERIAL AND WORKMANSHIP WARRANTY

- .1 Warranty against defects or deficiencies shall be for a period of one year from date of substantial completion.

1.10 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material [in appropriate on-site] bins for recycling.
- .3 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .4 Divert unused paint and joint sealer material from landfill to official hazardous material collections site approved by Consultant.
- .5 Do not dispose of unused paint and joint sealer materials into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

- .1 Aluminum Composite Panels (ACP)
 - .1 Pre-formed aluminum composite panels in locations as indicated on drawings.
 - .2 Composition: Two sheets of aluminum sandwiching a core of extruded thermoplastic formed in a continuous process without the use of glues or adhesives between dissimilar materials. Bond integrity testing to adhere to ASTM D1781-76
 - .3 Aluminum face sheets: Aluminum alloy 3003, thickness: 0.51 mm
 - .4 Panel thickness: 4 mm
 - .5 Panel weight: 5.28 kg/sq.m.
 - .6 Tolerances:
 - .1 Panel bow: Maximum 0.8% of panel dimension (width or length).
 - .2 Panel Dimensions: Take site measurements before proceeding with production unless dimensions can be guaranteed by General Contractor.
 - .3 Panel lines, breaks and angles to be sharp and true; panel surfaces to be free from warp or buckle.
 - .7 Panel System: Dry joint SL-2000 with 12.5 mm wide panel joints using proprietary aluminum extrusions or approved equal.
 - .8 Aluminum Composite to have a fire resistant core, meeting OBC requirements for non-combustible materials.
 - .9 Acceptable materials and manufacturers:
 - .1 Alucobond Plus, Alpolic; Kanalco Ltd., Flynn Canada, Alcotex, Alfrex FR Metal Composite Panel or others meeting the exact fire rated and compositional requirements of this specification and having colours and 'wood grain look' options to the satisfaction of the architect.
- .2 Panel finishes: Duranar, three coat, coil-coated baked enamel finish containing Kynar 500 polyvinylidene fluoride resin, metallic finish as specified below.
- .3 Panel Colours: Allow for 2 colours:
 - .1 Colour: light grey/white as selected by consultant from manufacturer's full colour range, including metallic series.
 - .2 Locations: Wall panels at window replacement locations as noted on drawings.
 - .3 Contractor to submit triplicate samples of colours for review by Consultant prior to order and fabrication.
- .4 Panel and Wall Accessories
 - .1 Provide proprietary aluminum extrusions to manufacturer's standard profiles for a complete installation.
 - .2 Provide aluminum integrated roof parapet cap flashing where indicated on drawings.

- .3 Provide 'ISO Clips' (thermal isolation clips) as manufactured by Northern Facades or approved equivalent. Provide at all connection locations to reduce thermal bridging.
- .4 Fasteners: as recommended by panel manufacturer, concealed and non-corrosive.
- .5 Extrusions and extrusion clips for attaching panels to the sub-structure: Purpose made aluminum.
- .6 Extrusions shall be full length around panel perimeter for panel reinforcement and alignment. Intermittent clips are unacceptable.
- .7 Joint filler strip: Same material and color as panels. Use of caulking at joints is not acceptable.
- .8 Plastic shims, shall be used as thermal separator between extrusions and sub-girts.
- .9 Sub-girts: To be manufactured from G-90 galvanized steel and shall be designed to accommodate expansion and contraction, dynamic movements and design load requirements.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 PREPARATION

- .1 Protect metal surfaces in contact with concrete, masonry mortar, plaster or other cementitious surface with isolation coating.

3.3 INSTALLATION

- .1 Wall Panel System:
 - .1 Before proceeding, examine work of other sections upon which this section depends.
 - .2 Sub-girts: Prior to installation of insulation air vapour barrier under Section 072710- Air Barriers erect subgirts fastened to masonry wall in accordance with system manufacture's installation instructions. Ensure that all penetrations through air/ vapor barrier are sealed.
 - .3 After installation of insulation/ air vapour barrier under Section 072710 – Air Barriers and Section 072113 – Board Insulation, erect panels and joint filler strip in accordance with manufacturer's details to meet specified design criteria and performance.
 - .4 Finished work shall be securely anchored, free of distortion, free of surface imperfections and uniform in colour.
 - .5 Use concealed fastenings only.
 - .6 Install panels plumb, true, level and in alignment to established lines and elevations.

3.4 CONTROL/EXPANSION JOINTS

- .1 Construct control and expansion joints where required or as indicated.
- .2 Use cover sheets, of brake formed profile, of same material and finish as adjacent material.
- .3 Use mechanical fasteners to secure sheet materials.
- .4 Assemble and secure wall system to structural frame so stresses on sealants are within manufacturers' recommended limits.

3.5 FIELD QUALITY CONTROL

- .1 Have manufacturer of products supplied under this Section review Work involved in handling, installation/application, protection and cleaning of its product[s], and submit written reports in acceptable format to verify compliance of Work with Contract.
- .2 Manufacturer's field services: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- .3 Manufacturer to schedule site visits to review Work at stages listed:
 - .1 After delivery and storage of products, and when preparatory Work on which Work of this Section depends is complete, but before installation begins.
 - .2 Three times during progress of Work: at start up, at 25% and 70% complete.
 - .3 Upon completion of Work, after cleaning is carried out.
- .4 Obtain reports within three days of review and submit.

3.6 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Wash down exposed interior and exterior surfaces using solution of mild domestic detergent in warm water, applied with soft clean wiping cloths. Wipe interior surfaces clean as part of final clean-up.
- .3 Remove excess sealant with recommended solvent.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .5 Remove protective plastic film from panels.
- .6 Repair and touch-up with colour matching high grade enamel minor surface damage.
- .7 Replace damaged panels and components which cannot be satisfactorily repaired.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials, preparation and application for caulking and sealants.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 07 62 00 – Sheet Metal Flashing and Trim.
- .3 Section 08 11 14 – Steel Doors and Frames.
- .4 Section 04 21 13 - Masonry.
- .5 Section 07 46 13 – Preformed Metal Siding.

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C919-[02], Standard Practice for Use of Sealants in Acoustical Applications.
- .2 Canadian General Standards Board (CGSB)
 - .1 CGSB 19-GP-5M-[1984], Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
 - .2 CAN/CGSB-19.13-[M87], Sealing Compound, One-component, Elastomeric, Chemical Curing.
 - .3 CGSB 19-GP-14M-[1984], Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
 - .4 CAN/CGSB-19.17-[M90], One-Component Acrylic Emulsion Base Sealing Compound.
 - .5 CAN/CGSB-19.24-[M90], Multi-component, Chemical Curing Sealing Compound.
- .3 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .4 General Services Administration (GSA) - Federal Specifications (FS)
 - .1 FS-SS-S-200-[E(2)1993], Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .6 Transport Canada (TC)

- .1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.4 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Manufacturer's product to describe.
 - .1 Caulking compound.
 - .2 Primers.
 - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
- .3 Submit manufacturer's instructions in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Instructions to include installation instructions for each product used.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal of paper, plastic, polystyrene, corrugated cardboard, or packaging material [in appropriate on-site bins] for recycling.
- .3 Place materials defined as hazardous or toxic in designated containers.
- .4 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .5 Unused [sealant] material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
- .6 Divert unused joint sealing material from landfill to official hazardous material collections site approved by Consultant.
- .7 Empty plastic joint sealer containers are not recyclable. Do not dispose of empty containers with plastic materials destined for recycling.
- .8 Fold up metal banding, flatten, and place in designated area for recycling.

1.7 PROJECT CONDITIONS

- .1 Environmental Limitations:

- .1 Do not proceed with installation of joint sealants under following conditions:
 - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.
 - .2 When joint substrates are wet.
- .2 Joint-Width Conditions:
 - .1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- .3 Joint-Substrate Conditions:
 - .1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.8 ENVIRONMENTAL REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

1.9 WARRANTY

- .1 Submit a warranty that caulking work will not leak, crack, crumble, melt, shrink, run, lose adhesion or stain adjacent surfaces, in accordance the General Conditions of the Contract, but for two (2) years total. Contractor shall supply all labour, materials, tools and equipment to repair and/or replace any work judged to be defective by the Consultant and sealant manufacturer at no additional cost to the owner for a period of 2 years from the date of Substantial Completion.
- .2 Submit a manufacturer's warranty against defects in materials and workmanship covering the components of the sealant for a period of ten (10) years. The manufacturer shall supply a non-pro-rated warranty covering labour, materials, tools and equipment to repair and/or replace any materials defects at no additional cost, for a period of 10 years

Part 2 Products

2.1 SEALANT MATERIALS

- .1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.
- .2 When low toxicity caulks are not possible, confine usage to areas which off gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off gas time.
- .3 Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

- .1 Primers: type recommended by sealant manufacturer.
- .2 Joint Fillers:
 - .1 General: compatible with primers and sealants, oversized 30 to 50%.
 - .2 Polyethylene, urethane, neoprene or vinyl: extruded closed cell foam, Shore A hardness 20, tensile strength 140 to 200 kPa.
 - .3 Neoprene or butyl rubber: round solid rod, Shore A hardness 70.
 - .4 Polyvinyl chloride or neoprene: extruded tubing with 6 mm minimum thick walls.
 - .5 Bond breaker: pressure sensitive plastic tape which will not bond to sealants.
 - .6 Sealant Type A: One component, chemical curing, conforming to CAN2-19.13-M82, Class C-2-25-B-N; multi-component, chemical curing, conforming to CAN2-19.24-M80, Type 2, Class B.
 - .7 Sealant Type B: Multi-component, chemical curing mildew resistant conforming to CGSB 19-GP-22M.
 - .8 Sealant type C: Multi-component, acrylic emulsion base, conforming to CGSB 19-GP-17M.
 - .9 Sealant type D: One component, polyurethane base, chemical curing, conforming to CAN2-19.13-M82, Class C-1-25-B-N; or multi-component, chemical curing, conforming to CAN2-19.24-M80, type 1.
 - .10 For exterior aluminum to masonry, aluminum to wood and aluminum to metal joints: high performance, single component modified elastomeric joint sealant conforming to CAN2-19.24-M80. Acceptable Materials: Sonolastic Ultra by Degussa.
 - .11 For interior aluminum to masonry, aluminum to wood and aluminum to metal joints: high performance, single component low odour sealant conforming to CAN/CGSB-19.13-M87. Acceptable materials: Spectrem 2 by Tremco.
- .3 Color of Sealants: to be selected by Consultant. Allow for a total of two (2) colours for Type A, two colours for Type B, two colours for Type C and one colour for Type D. Locations as directed on site by Consultant.
- .4 Joint cleaner: xylol, methylethyl-ketone or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.
- .5 Vent tubing: 6 mm inside diameter extruded polyvinyl chloride tubing.

2.3 JOINT CLEANER

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.
- .2 Primer: as recommended by manufacturer.

Part 3 Execution

3.1 PROTECTION

- .1 Protect installed Work of other trades from staining or contamination.

3.2 SURFACE PREPARATION

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.
- .3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4 Ensure joint surfaces are dry and frost free.
- .5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 MIXING

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 APPLICATION

- .1 New Work:
 - .1 Remove dust, paint, loose mortar and other foreign matter. Dry joint surfaces.
 - .2 Remove rust, mill scale and coatings from ferrous metals by wire brush, grinding or sandblasting.
 - .3 Remove oil, grease and other coatings from non-ferrous metals with joint cleaner.
 - .4 Prepare concrete, masonry, glazed and vitreous surfaces to sealant manufacturer's instructions.

- .5 Examine joint sizes and correct to achieve depth ratio 1/2 of joint width with minimum width and depth of 6 mm, maximum width 25 mm.
 - .6 Install joint filler to achieve correct joint depth.
 - .7 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
 - .8 Apply bond breaker tape where required to manufacturer's instructions.
 - .9 Prime sides of joints to sealant manufacturer's instructions immediately prior to caulking.
- .2 Sealant.
- .1 Apply sealant in accordance with manufacturer's written instructions.
 - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - .3 Apply sealant in continuous beads.
 - .4 Apply sealant using gun with proper size nozzle.
 - .5 Use sufficient pressure to fill voids and joints solid.
 - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .8 Remove excess compound promptly as work progresses and upon completion.
 - .9 Apply sealant to joints between window or door frames to adjacent building components around perimeter of every external window or door opening, to control joints in masonry walls and where indicated. In masonry cavity construction, vent caulked joints from cavity to 3 mm beyond external face of wall by inserting vent tubing at bottom of each joint and maximum to 1500 mm o.c. vertically. Position tube to drain to exterior.
 - .10 Apply sealant to close gaps at all junctures of all interior walls meeting exposed ceilings. Provide required foam backer rods to ensure integrity of sealant bead when applied to juncture. Tool finish smooth to receive paint finish.
 - .11 Use sealants specified in the following locations:
 - .1 Type A: Joints between windows or door frames and adjacent building components; control and expansion joints and all other locations where sealing is required, except in locations designated for Type B, C and D. Ensure that sealant chosen (from the several specified under "MATERIALS") for each location is recommended by manufacturer for use on surfaces encountered.
 - .2 Type B: Joints between splash backs and walls.
 - .3 Type C: Joints between interior metal door frames and partitions.
 - .4 Type D: Joints in horizontal surfaces between concrete slabs.
- .3 Curing.
- .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until proper curing has taken place.
- .4 Cleanup.

- .1 Clean adjacent surfaces immediately and leave Work neat and clean.
- .2 Remove excess and droppings, using recommended cleaners as work progresses.
- .3 Remove masking tape after initial set of sealant.

3.7 WORK INCLUDED

- .1 Work shall include but not limited to the following areas:
 - .1 exterior and interior hollow metal frames and screens; both sides;
 - .2 exposed control and expansion joints in masonry walls, masonry corners, joints in front of steel lintels bearing on exterior brick jambs;
 - .3 joints at all washroom vanities, hair dryers, hand dryers, electrical panels, access doors and adjacent surfaces. (Use sanitary caulking.)
 - .4 joints between masonry and concrete surfaces.
 - .5 joints between gypsum board and masonry, or other materials.
 - .6 joints between louvres and other surfaces.
 - .7 exterior siding, prefinished metal fascia, flashing and trim.
 - .8 penetrations through roofs, floors and walls other than firestopping
 - .9 at all other locations on drawings, except as noted below.
- .2 Sealing of joints to the underside of exposed precast slab to be by precast installer.
- .3 Sealing of all joints at top of walls meeting exposed flat or sloped precast ceilings to be included in this section.

3.8 REQUIRED INSPECTION

- .1 Contractor to engage exterior sealant manufacturer's representative to review in order to provide manufacturer's warranty. Manufacturer's representative shall review substrate conditions as prepared on site and prior to the application of the sealant. If requested, manufacturer to supply a written copy of this warranty.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 07 92 10 - Joint Sealing: Caulking of joints between frames and other building components.
- .3 Section 08 71 10 - Door Hardware - General: Supply of finish hardware, including weatherstripping and mounting heights.
- .4 Section 09 91 23 - Interior Painting.
- .5 Section 09 91 13 - Exterior Painting.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM A653/A653M-[01a], Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .2 ASTM B29-[92(1997)], Specification for Refined Lead.
 - .3 ASTM B749-[97], Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181-[99], Ready-Mixed Organic Zinc-Rich Coating.
 - .2 CGSB 41-GP-19Ma-[84], Rigid Vinyl Extrusions for Windows and Doors.
- .3 Canadian Standards Association (CSA International)
 - .1 G40.20/G40.21-[98], General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CSA W59-[M1989(R2001)], Welded Steel Construction (Metal Arc Welding) (Metric Version).
- .4 Canadian Steel Door Manufacturers' Association, (CSDMA).
 - .1 CSDMA, Specifications for Commercial Steel Doors and Frames, [1990].
 - .2 CSDMA, Recommended Selection and Usage Guide for Commercial Steel Doors, [1990].
- .5 National Fire Protection Association (NFPA)
 - .1 NFPA 80-[99], Standard for Fire Doors and Fire Windows.
 - .2 NFPA 252-[99], Standard Methods of Fire Tests of Door Assemblies.
- .6 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN4-S104-[80(R1985)], Fire Tests of Door Assemblies.

- .2 CAN4-S105-[85(R1992)], Fire Door Frames Meeting the Performance Required by CAN4-S104.
- .7 CAN/ULC-S701-[01], Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .8 CAN/ULC-S702-[97], Thermal Insulation, Mineral Fibre, for Buildings.
- .9 CAN/ULC-S704-[01], Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

1.3 DESIGN REQUIREMENTS

- .1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35°C to 35°C.
- .2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.

1.4 WORK INCLUDED

- .1 A single manufacturer shall fabricate products included within the scope of this Section.
- .2 Manufacturer shall be a member in good standing of the Canadian Steel Door Manufacturers Association (CSDMA).
- .3 Supply only of steel frame products including frames, transom frames, sidelight and window assemblies with provision for glazed, paneled or louvered openings, fire labeled and non-labeled, as scheduled or detailed by the Consultant.
- .4 Supply only of flush steel doors with provision for glazed, paneled or louvered openings, insulated and un-insulated, fire labeled, with or without temperature rise ratings and non-labeled, as scheduled or detailed by the Consultant.
- .5 Supply only of steel panels, similar in construction to steel doors, with flush or abetted bottoms for steel frames, transom frames, sidelight and window assemblies, fire labeled and non-labeled, as scheduled or detailed by the Consultant.

1.5 RELATED WORK

- .1 Building-in of frame product into unit masonry, previously placed concrete, structural or steel or wood stud walls.
- .2 Supply and installation of wood, plastic or composite core doors.
- .3 Supply and installation of builders' hardware except as specified for acoustic assemblies.
- .4 Drilling and tapping for surface mounted or non-templated builders' hardware.
- .5 Caulking of joints between frame product and other building components.
- .6 Supply and installation of gaskets or weather-strip.
- .7 Supply and installation of louvers or vents.

- .8 Supply and installation of glazing materials.
- .9 Site touch-up and painting.
- .10 Wiring for electronic or electric hardware.
- .11 Field measurements.
- .12 Fasteners for frame product in previously placed concrete, masonry or structural steel.
- .13 Steel lintels, posts, columns or other load-bearing elements.
- .14 Field welding.

1.6 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, or louvred, arrangement of hardware and fire rating and finishes.
- .3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing and fire rating finishes.
- .4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
- .5 Submit test and engineering data, and installation instructions.

1.7 REQUIREMENTS

- .1 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104M [NFPA 252] for ratings specified or indicated.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Divert unused paint and sealant materials from landfill to official hazardous material collections site approved by Consultant.
- .3 Do not dispose of unused paint and sealant materials into sewer systems, into lakes, streams, onto ground or in other locations where it will pose health or environmental hazard.
- .4 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.

- .5 Damaged or broken glazing materials are not recyclable. These materials must not be disposed of with materials destined for recycling.

1.9 TESTING AND PERFORMANCE

- .1 Door constructions covered by this specification shall be certified as meeting Level "A" (1,000,000 cycles) and Twist Test Acceptance Criteria (deflection not to exceed 6.4 mm /13.6kg force, total deflection at 136.1kg force not to exceed 63.5 mm and permanent deflection not to exceed 3.2 mm) when tested in strict conformance with ANSI-A250.4-1994. Test shall be conducted by an independent nationally recognized accredited laboratory.
- .2 Fire labeled product shall be provided for those openings requiring fire protection and temperature rise ratings, as determined and scheduled by the Architect. Doors, frames, transom frames and sidelight assemblies shall be tested in strict accordance with CAN4-S106. Product shall be listed by Underwriters Laboratories of Canada under an active Factory Inspection Program and shall be constructed as detailed in Follow-Up Service procedures issued to the manufacturer.
- .3 Should any door or frame specified by the Architect to be fire rated, not qualify for labeling due to design, hardware, glazing or any other reason, the Consultant shall be so advised before manufacturing commences.
- .4 Core materials for exterior doors shall attain a thermal resistance rating of RSI 1.06 (R6.0) when tested in accordance with ASTM C177 or ASTM C518.
- .5 Product shall be manufactured by a firm experienced in the design and production of standard and custom commercial steel door and frame assemblies, the integration of builders' or electronic hardware and glazing materials and their impact on the scope of work.
- .6 Manufacturer shall be assessed and registered as meeting the requirements of Quality Systems under ISO 9001.
- .7 Product quality shall meet standards set by the Canadian Steel Door Manufacturers Association.

1.10 TEST REPORTS

- .1 All alternates to this specification shall be submitted to the Architect for acceptance ten (10) days prior to bid date, complete with test reports from independent, nationally recognized testing authorities, certifying that:
 - .1 Steel door and frame assemblies furnished under this section meet the acceptance criteria of ANSI-A250.4-1994, Level "A".
 - .2 Insulated door cores furnished in exterior doors under this Section meet the specified thermal resistance rating.
- .2 All reports shall include name of testing authority, date of test, location of test facility, descriptions of test specimens, procedures used in testing and indicate compliance with acceptance criteria of the test.

1.11 WARRANTY

- .1 All steel door and frame product shall be warranted from defects in workmanship for a period of one (1) year from date of shipment.
- .2 All steel door and frame product shall be warranted against rust perforation for a period of ten (10) years when the installed and finish painted with a commercial quality paint to the manufacturers recommendations.
- .3 Finish paint adhesion on all door and frame product shall be warranted for a period of ten (10) years when the product has been properly cleaned and finish painted with a commercial quality paint applied as recommended by the paint manufacturer. This warranty shall not exceed that provided by the paint manufacturer.

Part 2 Products

2.1 MATERIALS

- .1 Doors shall be fabricated from tension leveled steel to ASTM A924-M97, galvanized to ASTM A653-M97, Commercial Steel (CS), Type B, coating designation ZF75, known commercially as paintable Galvanneal.
 - .1 Acceptable Manufacturer: Flemming
 - .2 Acceptable Alternate Manufacturer: Trillium Steel Doors Limited, or others meeting these exact specifications outlined in this section and accepted in writing during the tender period.
- .2 Door Cores:
 - .1 Honeycomb:
 - .1 Structural small cell (25.4 mm maximum) kraft paper “honeycomb”. Weight: 36.3 kg per ream (minimum), density: 16.5 kg/m³ (minimum), sanded to the required thickness.
 - .2 Polystyrene:
 - .1 Rigid extruded, fire retardant, closed cell board, density 16kg/m², thermal values: RSI 1.06 minimum, conforming to ASTM C578.
 - .3 Temperature Rise Rated (TRR):
 - .1 Solid slab core of non-combustible, inorganic composite to limit temperature rise on the “unexposed” side of door to 250°C at 30 or 60 minutes, as required by governing building code requirements and determined and scheduled by the Architect.
 - .4 Adhesives:
 - .1 Honeycomb Cores and Steel Components: Heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement or ULC approved equivalent.
 - .5 Interlocking Edge Seams:
 - .1 Resin reinforced polychloroprene (RRPC), fire resistant, high viscosity, sealant/adhesive or UL approved equivalent.
 - .6 Polystyrene Cores:

- .1 Heat resistant, epoxy based, low viscosity, contact cement.
- .7 Primer:
 - .1 Rust inhibitive touch-up only.
- .8 Exterior Top Caps:
 - .1 Rigid polyvinylchloride (PVC) extrusion.

2.2 DOOR FABRICATION

- .1 Contractor is to site confirm dimensions of all existing hollow metal frames to remain and receive new hollow metal doors, including coordination of all hardware installation between frame and door.
- .2 This section is based on doors and frames as manufactured by Fleming. Doors and frames by other manufacturers are acceptable subject to be similar to the one specified and meeting the terms of this section.
- .3 Doors shall be swinging, 44.4 mm thick of the types and sizes indicated on the Architect's schedules or drawings.
- .4 Exterior doors shall be lock seam, flush.
- .5 Face sheets for exterior doors shall be fabricated from (16) gauge steel.
- .6 Longitudinal edges of exterior doors shall be fully welded, ground smooth with no visible seams.
- .7 Face sheets of interior doors shall be fabricated from 18 gauge steel, except for heavy traffic doors (noted **HT** in Door Schedule) face sheet to be 16 gauge.
- .8 Longitudinal edge of heavy traffic doors (noted **HT** in Door Schedule) shall be mechanically interlocked, fully welded, ground smooth with no visible seams. Do not fill seams.
- .9 Interior doors shall be stiffened, insulated and sound deadened with honeycomb core laminated under pressure to each face sheet.
- .10 Stiffened, insulated and sound deadened with Fleming's propriety core where Temperature Rise Rated (TRR) fire labeled doors are specified on the Architect's schedules.
- .11 Longitudinal edges of interior doors shall be mechanically interlocked, adhesive assisted with edge seams and tack-welded every 150 mm and filled flush.
- .12 Door faces of all steel doors shall be fabricated without visible seams, free of scale, pitting, coil brakes, buckles and waves.
- .13 Formed edges shall be true and straight with a minimum radius for the thickness of steel used.
- .14 Lock and hinge edges shall be beveled 3 mm in 50 mm unless builders' hardware or door swing dictates otherwise.

- .15 Top and bottom of doors shall be provided with inverted, recessed, 16 gauge steel end channels, welded to each face sheet at 150 mm on center maximum.
- .16 Exterior doors shall be provided with factory installed flush PVC top caps. Fire labeled exterior doors shall be provided with factory installed flush steel top caps.
- .17 Unless ineligible due to design, size, hardware or glazing specified on the Architects' or hardware Suppliers' schedules or details, fire labeled doors shall be provided for those openings requiring fire protection ratings and temperature rise ratings, as determined and scheduled by the Architect.
- .18 Exterior doors and high traffic doors shall be internally reinforced with 20 gauge continuous; interlocking steel stiffeners at 150mm O.C. max, with voids between stiffeners filled and insulated with 24kg/m³ density loose batt type fiberglass material to suit fully welded design.
- .19 Doors shall be factory blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templates provided by the hardware supplier.
- .20 Doors shall be factory blanked and reinforced only for mortised hardware that is not fully templated.
- .21 Doors shall be factory reinforced only for surface mounted hardware.
- .22 Templated holes 12.7mm diameter and larger shall be factory prepared, except mounting and through bolt holes, which shall be by the contractor responsible for installation on site, at the time of application. Templated holes less than 12.7mm diameter shall be factory prepared only when required for the function of the device (for knobs, levers, cylinders, thumb or turn pieces) or when these holes over-lap function holes.
- .23 Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation on site, at the time of application.
- .24 Hinge and pivot reinforcements shall be 10 gauge steel minimum high frequency type reinforcing.
- .25 Hinge reinforcements for acoustic doors and doors in excess of 2450mm rabbit height shall be 10 gauge minimum with each cutout provided with 114.3mm heavy weight (4.6mm) high frequency type.
- .26 Lock, strike and flush bolt reinforcements shall be 12 gauge steel minimum.
- .27 Reinforcements for concealed closers and holders shall be 12 gauge steel minimum.
- .28 For surface mounted hardware, reinforcements shall be 16 gauge steel minimum.
- .29 All pairs of fire labeled doors shall be provided with 12 gauge steel surface mounted flat bar astragal, shipped loose for application on site, by the contractor responsible for installation.

- .30 Pairs of doors up to 2450mm x 2450mm, to 1½ hour fire rating maximum shall be provided without astragals. Lock edge seam of such doors shall be tacked-welded and ground smooth. All other fire labeled pairs shall be provided with 12 gauge steel surface mounted flat bar astragal, shipped loose for application on site, by the contractor responsible for installation.
- .31 Where electrically or electronically operated hardware is specified on the Architects' schedules or details of the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes, where indicated on the templates, shall be provided and interconnected with CSA Approved 12.7mm diameter conduit and connectors.
- .32 Prepare doors to receive security door contacts – refer to electrical drawings for locations. Door contacts to be installed at 100 mm from the latch side door edge.

2.3 GLAZING

- .1 Where 6mm thick glazing materials are specified on the Architects schedules or details, doors shall be provided with 20 gauge steel glazing trim and snap-in glazing stops.
- .2 Where other than 6mm glazing is specified on the Architect's schedules or details, doors shall receive 20 gauge steel trim and screw fixed glazing stops. Screws shall be #6 x 32mm oval head scrulox (self-drilling) type at 300mm on center maximum.
- .3 Glazing trim and stops shall be accurately fitted, butted at corners, with removable glazing stops located on the 'push' side of the door.

2.4 LOUVER

- .1 Where specified on the Architect's schedules or details, non-labeled doors shall be prepared in accordance with the louver manufacturer's details.
- .2 Where specified on the Architect's schedules or details, fire labeled doors shall be prepared for UL listed sight-proof fusible link louvers in accordance with the louver manufacturer's details.
- .3 Louvers shall be supplied and installed by others.

2.5 FINISHING

- .1 Remove weld slag and splatter from exposed surfaces.
- .2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth uniform surfaces.
- .3 On exposed surfaces where zinc coating has been removed during fabrication, doors shall receive a factory applied touch-up primer.
- .4 Primer shall be fully cured prior to shipment.

2.6 PANELS

- .1 Panels shall be fabricated from the same materials, construction and finished in the same manner as doors as specified in Section 2.1.

2.7 PRIMER

- .1 Touch-up prime CAN/CGSB-1.181.

2.8 PAINT

- .1 Field paint steel doors and frames in accordance with Section[s] 09 91 22 – Painting. Protect weatherstrips from paint. Provide final finish shall be free of scratches or other blemishes.

2.9 FRAMES FABRICATION GENERAL

- .1 Steel:
 - .1 Frame product shall be fabricated from tension leveled steel to ASTM A924-M97, galvanized to ASTM A653-M97, Commercial Steel (CS), Type B, coating designated ZF75, known commercially as paintable Galvanneal.
- .2 Primer:
 - .1 Rust inhibitive touch up only.
- .3 Miscellaneous:
 - .1 Door Silencers: GJ-64, Single Stud rubber/neoprene type
 - .2 Thermal Breaks: Rigid polyvinylchloride (PVC) extrusion
 - .3 Fiberglass: Loose batt type, density: 24kg/m³ (minimum), conforming to ASTM C665.
- .4 General:
 - .1 All steel frame product shall be as manufactured by Fleming of the types, sizes and profiles indicated on the Architects' schedules or details.
 - .2 Exterior frames shall be thermally broken, Fleming *Therma-Frame* Series, fabricated from 16 gauge steel.
 - .3 Exterior frame product shall be supplied profile welded (PW)
 - .4 Interior and exterior sections of thermally broken frames shall be separated by a continuous PVC thermal break.
 - .1 Thermally broken sections shall not be assembled by means of screws, grommets or other fasteners and welds shall not cause thermal transfers between interior and exterior surfaces of the frame sections.
 - .2 Closed sections (mullions and center rails) of thermally broken frames shall be factory insulated with 24kg/m³ loose batt type fiberglass material.
- .5 Insulation of open sections (jambs, heads and sills) on exterior frame product shall be provided and installed by the contractor responsible for installation.
- .6 Interior frames shall be Fleming F-Series, fabricated from 16 gauge steel.

- .7 Interior frame product shall be supplied profile welded (PW)
- .8 Knocked-down and knocked-down drywall frames shall not be acceptable.
- .9 Jambs, heads, mullions, sills and center rails shall be straight and uniform throughout their lengths.
- .10 Frame product shall be square, free of defects, wraps or buckles.
- .11 Corner joints shall be profile welded (PW) (continuously welded on the inside of the profiles' faces, rabbets, returns and soffit intersections with exposed faces filled and ground to a smooth, uniform, seamless surface)"
- .12 Joints at mullions, transom bars, sills or center rails shall be coped accurately, butted and tightly fitted, with faces securely welded, matching corner joint faces.
- .13 All steel mullions will be fabricated from the same materials as specified for the steel frames. Steel mullions will be fabricated as a fully assembled three piece unit consisting of a front, back and full height one piece attachment clip as per Fleming F Series. The attachment clip will completely fill the stop area of the mullion on both sides and span the void between each side forming a grid channel like structure. Mullions used as hinge mullions or strike mullions between doors will be filled with grout by the general contractor either prior to or following installation of the frame. The head of the frame shall have an opening sufficient for the grout to be poured in to the mullion.
- .14 Mullions shall be fabricated with continuous 20 gauge galvanized steel internal reinforcing clips.
- .15 Frame product shall be fabricated with integral door stops having a minimum height of 16mm.
- .16 Glazing stops shall be formed 20 gauge steel, 16mm height channel, accurately fitted, butted at corners and fastened to frame sections with #6 x 32mm oval head scrulox (self-drilling) type screws at 300mm on center maximum.
- .17 Where required due to site access, as indicated on the Architects' schedules or details, when advised by the contractor responsible for co-ordination or installation, or when shipping limitations so dictate, frame product shall be fabricated in sections for splicing in the field.
 - .1 Field spliced jambs, heads and sills shall be provided with 16 gauge steel splice plates securely welded into one section, extending 100mm minimum each side of splice joint.
 - .2 Field splices at closed sections (mullions or center rails) shall be 16 gauge steel splice angles securely welded to the abutting member. Face of splice angle shall extend 100mm minimum into closed sections when assembled.
 - .3 Field splice joints shall be welded, filled and ground to present a smooth uniform surface by the contractor responsible for installation after assembly.
- .18 Each door opening shall be provided with two (2) temporary steel jamb spreaders welded to the base of the jambs or mullions to maintain proper alignment during shipping and

- handling. Spreaders shall be removed by the contractor responsible for installation prior to anchoring of frame to floor.
- .19 Each door opening shall be prepared for GJ-64 or equivalent, single stud door silencers, three (3) for single door openings, two (2) for double door openings. Silencers shall be shipped loose for installation by the contractor after finish painting.
- .20 Unless ineligible due to design, size, hardware or glazing specified on the Architects' or Hardware Suppliers' schedules or details, fire labeled frame product shall be provided for those openings required fire protection ratings as determined and scheduled by the Architect.
- .21 Hardware Preparations:
- .1 Frame product shall be blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templated provided by the hardware supplier.
 - .2 Frame product shall be factory blanked and reinforced only for mortised hardware that is not fully templated.
 - .3 Frame product shall be reinforced only for surface mounted hardware.
 - .4 Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation on site, at the time of application.
 - .5 Frames shall be prepared for 114.3mm standard weight hinges (minimum).
 - .6 Hinge and pivot reinforcements shall be 10 gauge steel minimum reinforcing, high frequency type shall be provided.
 - .7 Hinge reinforcements for acoustic frames and frames in excess of 2450mm rabbet height shall be 10 gauge minimum with each cutout provided with 114.3mm heavy weight (4.6mm) high frequency type.
 - .8 Strike reinforcements shall be 16 gauge steel minimum.
 - .9 Reinforcements for surface mounted hardware, concealed closers and holders and flush bolts shall be 12 gauge steel minimum.
 - .10 Mortised cutouts shall be protected with 22 gauge steel minimum guard boxes.
 - .11 Where electrically or electronically operated hardware is specified on the Architects schedules or details or the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes, where indicated on templates, shall be provided and inter-connected with CSA Approved 12.7mm diameter conduit and connectors.
 - .12 Prepare frames to receive security door contacts – refer to electrical drawings for locations. Door contacts to be installed at 100 mm from the latch side door edge.
- .22 Anchorage:
- .1 Frame product shall be provided with anchorage appropriate to floor, wall and frame construction.
 - .2 Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb, except as indicated below.

- .3 Frame product installed in unit masonry partitions shall be provided with 4.0mm diameter steel wire anchors, 18 gauge steel adjustable stirrup and strap or "T" type anchors as conditions dictate.
 - .4 Where frame product is installed prior to construction of the adjacent wall, each jamb shall be provided with 16 gauge steel floor anchors. Each anchor shall be provided with two (2) holes for mounting to the floor and shall be securely welded to the inside of the jamb.
 - .5 Floor anchors for thermally broken exterior frames shall be designed so as not to permit thermal transfers from exterior to interior surfaces of the frame sections.
 - .6 Frame product installed in drywall partitions shall be provided with 20 gauge steel snap-in or "Z" type stud type anchor.
 - .7 Jambs of frames in previously placed concrete, masonry or structural steel shall be punched and dimpled to accept machine bolt anchors, 6.4mm diameter, located not more than 150mm from the top and bottom of each jamb. Anchor preparations and guides shall also be located immediately above or below the intermediate hinge reinforcements and directly opposite on the strike jamb. Each preparation shall be provided with 16 gauge anchor bolt guides.
 - .8 Anchor bolts and expansion shell anchors for the above preparations shall be provided by the contractor responsible for installation.
 - .9 After sufficient tightening of the anchor bolts, the heads shall be welded do as to provide a non-removable application. Welded bolt head and dimple shall be filled and ground to present a smooth uniform surface by the contractor responsible for installation, prior to finish painting.
 - .10 Where indicated on the Architects' schedules or details, channel extensions shall be provided from the top of the frame assembly to the underside of the structure above. Extensions shall be fabricated from 12 gauge steel formed channel, mounting angles welded to inside of frame head and adjusting brackets. Formed channels, adjusting brackets and fasteners shall be shipped loose. Channels shall be mechanically connected to mounting angles and adjusting brackets with supplied fasteners, on site, by contractor responsible for installation.
- .23 Finishing:
- .1 Remove weld slag and spatter from exposed surfaces.
 - .2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth and uniform surfaces.
 - .3 On exposed surfaces where zinc has been removed during fabrication, frame product shall receive a factory applied touch-up primer.
 - .4 Primer shall be fully cured prior to shipment.

2.10 SIZES AND TOLERANCES

- .1 All sizes and tolerances shall be in accordance with the Canadian Steel Door Manufacturers Association "Recommended Dimensional Standards for Commercial Steel Doors and Frames" as follows:
 - .1 Widths of door openings shall be measured from inside of frame jamb rabbet with a tolerance of +1.6mm, -0.8mm.

- .2 Heights of door openings shall be measured from the finished floor (exclusive of floor coverings) to the head rabbet of the frame with a tolerance of $\pm 1.2\text{mm}$.
- .3 Unless builders' hardware dictates otherwise, doors shall be sized so as to fit the above openings and allow a 3mm clearance at jambs and head. A clearance of 19mm between the bottom of the door and the finished floor (exclusive of floor coverings) shall be provided. Tolerances on door sizes shall be $\pm 1.2\text{mm}$.
- .4 Manufacturing tolerances on formed frame profiles shall be $\pm 0.8\text{mm}$ for faces, door stop heights and jamb depths. Tolerances for throat openings and door rabbet shall be $\pm 1.6\text{mm}$ and $\pm 0.4\text{mm}$ respectively. Hardware cutout dimensions shall be as per template dimensions, +0.4mm, -0.

2.11 HARDWARE LOCATIONS

- .1 Hardware preparations in frame product shall be as noted below and locations on doors shall be adjusted for clearances specified in 2.4.
- .2 Top of upper hinge preparation for 114.3mm hinges shall be located 180mm down from head, transom mullion or panel as appropriate. The top of the bottom hinge preparation for 114.3mm hinges shall be located 310mm from finished floor as defined in 2.4.3. Intermediate hinge preparations shall be spaced equally between top and bottom cutouts. For dutch door frames, top and bottom hinge locations shall be as above, with the tops of intermediate hinges located at 930mm and 1403mm from finished floor.
- .3 Strike preparations for unit, integral, cylindrical and mortise locks and roller latches shall be centered 1033mm from finished floor. Strikes for deadlocks shall be centered at 1200mm from finished floor. Strikes for panic or fire exit hardware shall be located as per device manufacturer's templates.
- .4 Push and/or pulls on doors shall be centered 10701mm from finished floor.
- .5 Preparations not noted above shall be as per hardware manufacturer's templates.
- .6 Hardware preparation tolerances shall comply with the ANSI A115 series standards.

Part 3 Execution

3.1 SITE AND PROTECTION OF MATERIALS

- .1 The contractor responsible for installation shall remove wraps or covers from door and frame product upon delivery at building site.
- .2 All materials shall be thoroughly inspected upon receipt and all discrepancies, deficiencies and/or damages shall be immediately reported in writing to the supplier, All damage shall be noted on the carriers' Bill of Landing.
- .3 Contractor responsible for installation shall ensure all materials are properly stored on planks or dunnage in a dry location. Product shall be stored in a vertical position, spaced with blocking to permit air circulation between them. Materials shall be covered to protect them from damage from any cause.

- .4 Contractor shall notify the supplier in writing of any errors or deficiencies in the product itself before initiating any corrective work.

3.2 **INSTALLATION GENERAL**

- .1 Install labelled steel fire rated doors and frames to NFPA 80 except where specified otherwise.
- .2 Install doors and frames to CSDMA Installation Guide.
- .3 Install doors and frames in accordance with the Door and Hardware Institute "Installation guide for doors and hardware".
- .4 Set frame product plumb, square, aligned, without twist at correct elevation.
- .5 Frame Product Installation Tolerances:
 - .1 Plumbness tolerance, measured through a line from the intersecting corner of vertical members and the head to the floor, shall be ± 1.6 mm.
 - .2 Squareness tolerance, measured through a line 90^0 from one jamb at the upper corner of the product, to the opposite jamb, shall be ± 1.6 mm.
 - .3 Alignment tolerance, measured on jambs, through a horizontal line parallel to the plane of the wall, shall be ± 1.6 mm.
 - .4 Twist tolerance, measured at face corners of jambs, on parallel lines perpendicular to the plane of the wall, shall be ± 1.6 mm.
- .6 Fire labeled product shall be installed in accordance with NFPA-80.
- .7 Secure anchorages and connections to adjacent construction.
- .8 Brace frame product rigidly in position while building-in. Remove temporary steel shipping jamb spreaders. Install wood spreaders at mid points of frame rabbet height and at floor level to maintain frame widths. Provide vertical support at center of head for openings exceeding 1250mm in width. Remove wood spreaders after product has been built-in.
- .9 Frame product in unit masonry shall be fully grouted in place.
- .10 Install doors maintaining clearances outlined in Section 2.4.
- .11 Install louvers and vents.
- .12 Adjust operable parts for correct clearances and function.
- .13 Steel surfaces shall be kept free of grout, tar or other bonding materials or sealers.
- .14 Any grout or other bonding material shall be cleaned from products immediately following installation.
- .15 Exposed field welds shall be finished to present a smooth uniform surface and shall be touched-up with a rust inhibitive primer.

- .16 Exposed surfaces that have been scratched or otherwise marred during shipment, installation or handling shall be touched-up with a rust inhibitive primer.
- .17 Finish paint in accordance with Section 099116 and 099123.
- .18 Install glazing materials and door silencers.

3.3 INSPECTION

- .1 In accordance with Section 011100- Summary of Work, upon assignment of an inspection agency the following inspections shall be performed:
 - .1 review of shop drawings for compliance with specification
 - .2 shop inspection during production. Should inspection notification not be given suitable to review fabrication, destructive testing of one or more doors will be undertaken either in the shop or on site at no additional cost to the owner. Doors destroyed for invasive inspection shall be replaced as part of the contract price.
- .2 Upon notification of initial door installation, contractor shall notify inspector to witness installation practice and at periodic points for duration of installation period.

3.4 FINISH REPAIRS

- .1 Touch up with primer finishes damaged during installation.
- .2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

3.5 GLAZING

- .1 Install glazing for doors and frames in accordance with Section 08 80 50 - Glazing.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

1. Section 08 71 10 – Door Hardware
2. Section 10 11 25 – Manufactured Specialties Item 2.1.14

1.2 REQUIRMENTS OF REGULATORY AGENCIES

1. Fabricate and install all doors to the following standards. AWMAC Quality Standards for Architectural Woodwork, latest edition
2. CAN/CSA-0132.2 Series-90, Wood Flush Doors
3. CAN4-S104-M80, fire tests of door assemblies
4. CAN4-S105-M85, Fire Door Frames
5. NFPA-80, Fire doors and Windows, latest edition.

1.3 SAMPLES

1. Submit samples in accordance with Section 01 33 00
2. Submit one 12” x 12” corner sample of each type of door
3. Show door construction, core, glazing details and faces.

1.4 SHOP DRAWINGS

1. Submit shop drawings in accordance with Section 01300 Submittals.

1.5 GUARANTEE

1. All doors shall be fully guaranteed for a period of three (3) years against manufacturing defects, core ghosting and warping, delamination of veneer, after Substantial Completion.

Part 2 General

2.1 MATERIALS

1. Acceptable door manufacturers:
 - .1 Algoma
 - .2 Cambridge
 - .3 Dormond
 - .4 Lambton
 - .5 Marshfield

2. Doors shall be of the sizes, thickness and type as shown on the drawings.
3. Solid core doors shall be constructed with urea-formaldehyde free particle board to ANSI A208.1, ID2. For Fire rated doors provide core in accordance with fire test requirements..
4. Doors shall be provided with vision panels as called for on the Door Schedules and supplied complete with wood glazing stops for 20 minute rated doors and ULC approved metal glazing stops for 45 minute or 60 minute rated doors.
5. Doors shall be complete with labels indicating approved fire resistance rated as required.
6. Undercut or rebate bottom rails as required.
7. Crossband – 3 ply hardwood plywood not less than 1/8” thick before sanding
8. Vertical and horizontal edges, stops and beads for glass and grilles to match face veneer. Edges shall be minimum 1 ½” wide by thickness of door.
9. Stiles and rails to be low density softwood staved type minimum 1 ½” wide with ¾” thick hardwood edge banding. Moisture content shall not exceed 8%.
10. Glazing beads to be flush type front edge recessed 1/8” at bottom. Mitre cut and fil all corners to form tight flush joints.
11. Face veneer shall be plastic laminate from Nevamar Plastic Laminate ARP surface distributed by McFaddens. Approved alternates by Wisonart, Formica or Arborite. Allow for maximum of 2 colours from full range, including solids and wood grains as chosen by Consultant.
12. Colours to later selection by Consultant as specified in Plastic Laminates.

2.2 FABRICATION

1. Door cores unframed, solid laminated wood stave core construction, comprising narrow pieces of kiln dried wood, grain running vertically and end joints well staggered, solid, (no voids) and electronically glue bonded. Floating core construction will not be accepted. Sand door cores both sides prior to application of faces.
2. If particle board core or fire rated cores used, frame with 1 1/8” minimum wood stiles and 2 ¾” minimum wood rails; edge stiles with birch ¾” wide minimum, full length piece. Glue tiles and rails to core and apply face veneer and machine flush with door edges.
3. Seal tope and bottom edges with two coats urethane finish or lacquer applied to door manufacturer’s plant.
4. Attach ULC labels to fire doors and frames as required
5. Preparation of doors shall include provision for extra hinges, heavy weight butts and mortised or cylinder locksets as required of hardware tender documents.
6. Preparation of doors and frames shall make appropriate provision for sound seals as indicated on Door Schedule.

7. Prepare glazing stops to receive insulated, sealed glazing as required on Door Schedule.

Part 3 Execution

3.1 FITTING AND HANGING DOORS

1. Doors shall be delivered to site, protected in transit from any damage from weather or handling and similarly stored in a protected area until hung in place.
2. Doors shall be hung by skilled carpenters.
3. Any planning of edges required for proper installation shall be sanded smooth prior to final installation.
4. Neatly and accurately fit required finishing hardware. Refer to section 08 71 10 - Finishing Hardware.
5. The completed installation required all doors to fit accurately in their frames, swing easily without binding and close snugly without movement when latch is engaged.

3.2 HARDWARE INSTALLATION

- .1 Receive hardware from Section 08 71 10.
- .2 Installation of the hardware is the responsibility of the General Contractor.
- .3 Adjust for correct function.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 61 00 - Common Product Requirements.
- .3 Section 01 78 00 - Closeout Submittals.
- .4 Section 05 50 00 - Metal Fabrications: Metal fabricated framed openings, structural support framing for sloped glazing.
- .5 Section 07 27 10 - Air Barriers - Descriptive or Proprietary.
- .6 Section 07 84 00 - Firestopping: Fire safing between floor edge and curtain wall system.
- .7 Section 07 92 10 - Joint Sealing: System perimeter sealant and back-up materials.
- .8 Section 08 80 50 - Glazing.
- .9 Section 09 91 23 - Interior Painting: Field painting of interior surface of infill.

1.2 REFERENCES

- .1 Aluminum Association Designation System For Aluminum Finishes (AA)-[1997].
 - .1 DAF 45 [2003], Designation System For Aluminum Finishes.
- .2 American Architectural Manufacturers Association (AAMA).
 - .1 AAMA CW-DG-1-[96], Aluminum Curtain Wall Design Guide Manual.
 - .2 AAMA CW-10-[97], Care and Handling of Architectural Aluminum From Shop to Site.
 - .3 AAMA CW-11-[85], Design Wind Loads for Buildings and Boundary Layer Wind Tunnel Testing.
 - .4 AAMA T1R-A1-[02], Sound Control for Fenestration Products.
 - .5 AAMA 501-[94], Methods of Test for Exterior Walls.
 - .6 AAMA 503-[92], Voluntary Specification for Field Testing of Metal Storefronts, Curtain Wall and Sloped Glazing Systems.
 - .7 AAMA 611-[98], Voluntary Specifications for Anodized Finishes Architectural Aluminum.
 - .8 AAMA 612-[02], Voluntary Specifications, Performance Requirements, and Test Procedures for Combined Coatings of Anode Oxide and Transparent Organic Coatings on Architectural Aluminum.
 - .9 AAMA 2603-[02], Voluntary Specification Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

- .10 AAMA 2604-[02], Voluntary Specification Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
- .3 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A36/A36M-[103a], Specification for Carbon Structural Steel.
 - .2 ASTM A123/A123M-[02], Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .3 ASTM A167-[99], Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .4 ASTM A653/A653M-[03], Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .5 ASTM B209-[02a], Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - .6 ASTM B221-[02], Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - .7 ASTM E283-[91(1999)], Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - .8 ASTM E330-[02], Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls, by Uniform Static Air Pressure Difference.
 - .9 ASTM E331-[00], Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform Static Air Pressure Difference.
 - .10 ASTM E413-[87(1999)], Classification for Rating Sound Insulation.
 - .11 ASTM E1105-[00], Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.
- .4 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB 1.108-[M89], Bituminous Solvent Type Paint.
 - .2 CAN/CGSB-12.20-[M89], Structural Design of Glass for Buildings.
- .5 Canadian Standards Association (CSA International).
 - .1 CSA-G40.20/G40.21-[98(R2003)], General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels.
 - .2 CAN/CSA-G164-[M92(R2003)], Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA-S136-[01], North American Specification for the Design of Cold-Formed Steel Structural Members.
 - .4 CAN3-S157-[M83(R2002)], Strength Design in Aluminum.
 - .5 CSA W59.2-[M1991(R2003)], Welded Aluminum Construction.
- .6 Environmental Choice Program (ECP).
 - .1 CCD-45-[95], Sealants and Caulking Compounds.
 - .2 CCD-47-[1998], Surface Coatings.

- .3 CCD-48-[95], Recycled Water-Borne Surface Coatings.
- .7 Society for Protective Coatings (SSPC).
 - .1 SSPC - Paint 20 Zinc Rich Coating.
 - .2 SSPC - Paint 25 Alkyd, Zinc Oxide Linseed Oil and Primer for Use Over Hand Cleaned Steel Type 1 and Type 2.

1.3 SYSTEM DESCRIPTION

- .1 Work included: Furnish labour, materials and other services to complete the fabrication and installation of the framing, including all materials and fitments required for the operation of any entrance units included, in the manner, direction and performance shown on the shop drawings and specified herein. Work not included: Structural support of framing, interior trims. Related work specified elsewhere.

1.4 QUALITY ASSURANCE

- .1 Installation crews engaged or provided by the approved supplier shall have proven experience specifically trained and qualified in this work (written proof of minimum of five (5) years employment or service with the window manufacturer or similar manufacturer). Individuals are to be either employees of the manufacturer and/or workers approved by the manufacturer.
- .2 Provide one (1) thoroughly experienced, reliable, qualified and competent foreman in charge of the work to be on site at all times when work is taking place. Individual to be designated in charge from start of activities on site until final deficiencies are complete. Foreman may only be changed by written approval *or request* of the Consultant or owner.
- .3 Window supplier is to have adequate plant and skilled tradesmen and is known to have manufactured and installed similar windows for a minimum of five (5) years in the Province of Ontario.

1.5 PERFORMANCE REQUIREMENTS

- .1 Structural performance shall be based on CSA standard CAN3-S157 "Strength Design in Aluminum" and a maximum deflection of 1/175 of the span.
- .2 Air infiltration shall not exceed 0.06 cfm/ft² (0.0003 m³/s-m²) when tested in accordance with ASTM E283 at a pressure differential of 6.24 p.s.f. (300 Pa.)
- .3 There shall be no water infiltration when tested in accordance with ASTM E331 with a pressure differential of 15.0 p.s.f. (720 Pa.) Thermally, the grid members shall have a condensation resistance equal to or better than the area along the bottom of a 1" sealed glass unit with standard metal spacer edge construction.
- .4 Size glass units and glass dimensions to limits established in CAN/CGSB-12.20.
- .5 Provide system to accommodate, without damage to components or deterioration of seals:
 - .1 Movement within system.
 - .2 Movement between system and perimeter framing components.
 - .3 Dynamic loading and release of loads.

- .4 Deflection of structural support framing.
- .5 Shortening of building concrete structural columns.
- .6 Creep of concrete structural members.
- .6 Vapour seal with interior atmospheric pressure of 25 mm sp, 22 degrees C, 40% RH: No failure.
- .7 Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.
- .8 Ensure no vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system occur.

1.6 PRODUCT DATA

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide component dimensions; describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details and water flow diagrams.

1.7 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate system dimensions, framed opening requirements and tolerances, internal millon reinforcement, adjacent construction, anchor details anticipated deflection under load, affected related Work, weep drainage network, expansion and contraction joint location and details, and field welding required.
- .3 Curtain wall shop drawings are to be approved for structural integrity by a Professional Engineer licensed to design structures in the Province of Ontario. Shop drawings are to bear Engineer's seal of approval.

1.8 SAMPLES

- .1 Drawings and specifications for work of this section are based upon Thermawall 2600 series Curtain Wall system by Alumicor. For all approved products and acceptable alternatives, submit supporting technical literature, samples, drawings and performance data to meet or exceed these specifications.
- .2 Submit two samples 800 x 800 mm in size illustrating prefinished aluminum surface, finish, colour, texture, specified glass units, insulated infill panels, glazing materials illustrating edge and corner.

1.9 DESIGN DATA

- .1 Submit design data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide framing member structural and physical characteristics, calculations, dimensional limitations, special installation requirements.

1.10 TEST REPORTS

- .1 Submit test reports in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit substantiating engineering data, test results of previous tests by independent laboratory which purport to meet performance criteria, and supportive data.

1.11 REGULATORY REQUIREMENTS

- .1 Conform to applicable code for acoustic attenuation, and sound transmission.
- .2 Use the following paragraph for assessing full sized erected assemblies for review of construction, coordination of work of several sections, testing, or observation of operation. A mock-up may also be used for assessing field applied finishes.

1.12 MOCK-UP

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Locate where directed.
- .3 Allow 24 hours for inspection of mock-up Consultant before proceeding with work.
- .4 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may not remain as part of finished work.

1.13 PRE-INSTALLATION MEETING

- .1 Convene one week before starting work of this section.

1.14 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, handle and protect materials in accordance with Division 1 requirements.
- .2 Handle work of this section in accordance with AAMA CW-10.
- .3 Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.15 ENVIRONMENTAL REQUIREMENTS

- .1 Do not install sealants when ambient and surface temperature is less than 5 degrees C.
- .2 Maintain this minimum temperature during and after installation of sealants.

1.16 SEQUENCING

- .1 Coordinate work of this section with installation of fire stopping, air barrier placement, vapour retarder placement, flashing placement, installing ductwork to rear of louvers.

1.17 WARRANTY

- .1 Submit a manufacturer's warranty against defects in materials and workmanship covering the components of the window system for a period of ten (10) years. The manufacturer shall supply a non-pro-rated warranty covering labour, materials, tools and equipment to repair and/or replace any materials defects at no additional cost, for a period of ten (10) years including defects or failures due to poor workmanship and installation.
- .2 The supplier shall also submit a warrantee, in accordance with Section 088050-Glazing, for 10 years warranting the sealed units against defects.

1.18 MAINTENANCE DOCUMENTS AND MATERIALS

- .1 Provide 2 copies of data for maintenance and routine cleaning.
- .2 Provide 2 copies of final record reviewed shop drawings for owner's records.
- .3 Contractor shall supply all accessories as may be required for the operation and performance of the windows system.

1.19 EXTRA MATERIALS

- .1 Provide extra materials of glass units in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide protected and packaged in wood crates suitable for storage. Clearly identify each crate.
- .3 Deliver Consultant, upon completion of the work of this section.
- .4 Store where directed by Consultant.

1.20 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

Part 2 Products

2.1 MATERIALS

- .1 **Exterior Curtain Walls** – Alumicor Thermawall 2600 or Kawneer 1600UT, Ultra Thermal Performance curtain wall, (63.5 mm x 190.5mm – incl. glazing & cap).
 - .1 Must be designed to withstand a wind load of min. 30 psf.
 - .2 Provide high thermal performance gaskets.
 - .3 Fixed (non opening) thermally broken anodized aluminum curtain wall system, glazed with tempered, insulating vision glass and tempered spandrel glass.
 - .4 Standard pressure cap for most locations.

- .7 Provide Structural Silicone Mullion (SSG) where noted on drawings. Back section depth to match capped assembly where noted in drawings.
- .8 Provide operable 'phantom vent 5000' where indicated on drawings.
- .9 Provide insect screens to operable vents at Learning Commons and Art Classrooms.
- .2 Acceptable Materials : Curtain wall systems meeting or exceeding these specifications manufactured by:
 - .1 Alumicor
 - .2 Alwind Industries
 - .3 Kawneer Company of Canada
 - .4 Windspec Inc.
- .3 Extrusions shall be 6063 T54 alloy and temper.
- .4 Formed aluminum components shall be sheet of alloy and temper suitable for their purpose and finish.
- .5 Fasteners shall be 300 series stainless steel or 400 series stainless steel cadmium plated and of sufficient size and quantity to perform their intended function.
- .6 Weathering and glazing gaskets shall be extruded, black, closed cell or dense elastomer of durometer appropriate to the function.
- .7 Provide glazed and aluminum spandrel sections where indicated on drawings.
- .8 Provide structural silicone mullions where described on drawings.
- .9 Refer to Section 08 80 50 – Glazing for information on tinted glazing sections. Refer to drawings for locations of tinted glazing.
- .10 Manufacturer / Installer to determine if mullions require internal reinforcement to achieve specified load resistance.

2.2 FINISHES

- .1 CLEAR ANODIZED.
 - .1 Exposed aluminum sections shall be given an anodic oxide treatment in accordance with Aluminum Association specification AA-M12C22A31: "Clear anodized".

2.3 FABRICATION

- .1 Fabricate aluminum work in accordance with reviewed shop drawings and manufacturer's written instructions.
- .2 Fabricate framing from extrusions of size and shape shown on shop drawings.
- .3 Vertical and horizontal members shall be tubular extrusions designed for shear block comer construction.

- .4 All joints shall be accurately machined, assembled and sealed to provide neat weather tight joints. Shielded drainage and pressure equalization vents shall be provided where required. AH horizontal members shall be sealed to vertical members to provide individual compartments within the system in accordance with the rain screen principle.
- .5 Fabricate system components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- .6 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- .7 Prepare components to receive anchor devices. Install anchors.
- .8 Arrange fasteners and attachments to ensure concealment from view.
- .9 Reinforce framing members for external imposed loads.
- .10 Visible manufacturer's identification labels not permitted.
- .11 Break shapes must be approved by the Consultant prior to use.
- .12 At all curtain wall spandrel panels exposed on interior of building, curtain wall spandrel panels shall be laminated w/ aluminum panel of same pre-finish as mullions with bent edges.
- .13 Provide spandrel panels at locations of exterior light fixtures as shown on elevations. Coordinate with Div. 16 for lighting location and size of openings.
- .14 All perimeter sections to be tubular/closed back sections for continuous adhesion and continuity of building envelope membrane.
- .15 Spandrel panels:
 - .1 Fabricate insulated spandrel panel inner facing of 20 gauge aluminum sheet. Wrap edges with aluminum sheet, enabling installation and minor movement of perimeter seal.
 - .2 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
 - .3 Place insulation within panel, adhered to exterior face of interior panel sheet over entire area of sheet with impale fasteners.
 - .4 Provide integral reinforcing and stiffeners as required to reinforce panel against deflection caused by wind and suction loads.
 - .5 Provide non-metallic spacers as necessary to separate dissimilar metals.
 - .6 Ventilate and pressure equalize the air space outside the exterior surface of the insulation, to the exterior.
 - .7 Arrange fasteners and attachments to ensure concealment from view.
 - .8 Glass panels: Consists of spandrel glass in accordance with Section 08 80 00 to the exterior with insulated backpan to the inside. Interior face of panel to be finished with a pre-finished aluminum sheet of the same grade as the exterior,

colour matching the exterior. Insulation thickness shall be as indicated, retained with stick clips. Seal all joints in shop with high grade butyl sealant, including perimeter seal at backpan. Colour to later selection by Consultant.

- .9 Metal panels: Consists of an exterior prefinished flush aluminum panel with panel stiffeners as required, to match colour of window framing, with insulation core thickness as indicated and galvanized sheet back-pan. Interior face of panel to be finished with a pre-finished aluminum sheet of the same grade as the exterior, colour matching the exterior.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify dimensions, tolerances, and method of attachment with other work.
- .2 Verify wall openings and adjoining air barrier and vapour retarder materials are ready to receive work of this section.

3.2 INSTALLATION

- .1 Framing shall be installed, glazed and adjusted by experienced personnel in accordance with the manufacturer's instructions and approved shop drawings. All items in this section shall be set in their correct location and shall be set level, square, plumb and at proper elevations and in alignment with other work.
- .2 Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- .3 Provide alignment attachments and shims to permanently fasten system to building structure. Clean weld surfaces; apply protective primer to field welds and adjacent surfaces.
- .4 Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances and align with adjacent work.
- .5 Provide thermal isolation where components penetrate or disrupt building insulation.
- .6 Co-ordinate attachment and seal of perimeter air barrier and vapour retarder materials.
- .7 Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- .8 Install fire-safing in areas as indicated.

3.3 FIELD QUALITY CONTROL

- .1 Inspection will monitor quality of installation and glazing.
- .2 Test to ASTM E1105, and AAMA 501.
- .3 Evaluate installed system by thermo-photographic scan.

3.4 ADJUSTING

- .1 Adjust operating sash for smooth operation.

3.5 CLEANING

- .1 Remove protective material from prefinished aluminum surfaces.
- .2 Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- .3 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

3.6 PROTECTION

- .1 Protect finished Work from damage.
- .2 Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.”

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 11 – Final Cleaning.
- .3 Section 08 80 50 – Glazing.
- .4 Section 07 92 10 - Joint Sealing: caulking of joints between frames and other building components.

1.2 REFERENCES

- .1 Aluminum Association (AA), Designation System for Aluminum Finishes (2000)
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.40-[97], Anticorrosive Structural Steel Alkyd Primer.
 - .2 CAN/CGSB-79.1-[M91], Insect Screens.
- .3 Canadian Standards Association (CSA) International
 - .1 CSA-A440-[00]/A440.1-[00], A440-[00], Windows / Special Publication A440.1-[00], User Selection Guide to CSA Standard A440-[00], Windows.
 - .2 CAN/CSA-G164-[M92(R1998)], Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CAN/CSA-Z91-[M90(R2000)], Safety Code for Window Cleaning Operations.

1.3 SYSTEMS AND MANUFACTURERS

- .1 Drawings and details are based on 1970 Series with 1350 Series Vents as manufactured by Alumicor Ltd.
- .2 Approved exterior window systems meeting or exceeding these specifications by the following manufacturers are to be supplied:
 - .1 Alumicor
 - .2 Alwind Industries
 - .3 Kawneer Company of Canada
 - .4 Windspec Inc.
- .3 Work of this Section must be designed by a Professional Engineer licensed to design structures in the Province of Ontario.
- .4 By submitting a price for supply and install; the Contractor for work to this section shall guarantee that he has carried products and pricing from one of the above approved manufacturers.

- .5 All curtain wall framing has been drawn using a nominal 5-1/4" framing and set back 30mm from brick veneer face.
- .6 All punch window framing has been drawn using a nominal 6" framing and set back 60mm from brick veneer face.

1.4 QUALITY ASSURANCE

- .1 Installation crews engaged or provided by the approved supplier shall have proven experience specifically trained and qualified in this work (written proof of minimum of five (5) years employment or service with the window manufacturer or similar manufacturer). Individuals are to be either employees of the manufacturer and/or workers approved by the manufacturer.
- .2 Provide one (1) thoroughly experienced, reliable, qualified and competent foreman in charge of the work to be on site at all times when work is taking place. Individual to be designated in charge from start of activities on site until final deficiencies are complete. Foreman may only be changed by written approval *or request* of the Consultant or owner.
- .3 Window supplier is to have adequate plant and skilled tradesmen and is known to have manufactured and installed similar windows for a minimum of five (5) years in the Province of Ontario.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Clearly indicate on shop drawings all materials and large scale details for head, jamb and sill as they will be installed in contact with building components for this project, profiles of components, elevations of unit, anchorage details, location of isolation coating, location of insulation to jambs head and sill, drainage locations, description of related components and exposed finishes and fasteners.
- .3 Show paths of interior drainage and venting.

1.6 CERTIFICATES

- .1 Submit manufacturer's certificate, and test performance data certifying compliance with specification requirements from an Independent Testing Laboratory, for:
 - .1 windows
 - .2 finishes.
 - .3 removable self framed insect screens.
 - .4 infiltration/exfiltration rates.
 - .5 thermal transfer resistance of frames.
 - .6 locking hardware
 - .7 vandal resistance

1.7 PERFORMANCE

- .1 The overall thermal transmittance of fenestration assemblies shall be less than 0.81 Btu. Thermal transmittance for the fenestration shall be determined using ASHRAE 90.1 calculation procedures and shall include the effect of sash, frame, edge effect and spacer for multiple-glazed units.
- .2 Fenestration shall meet CAN/CSA – A440 windows:
 - .1 Air Leakage: A3
 - .2 Water Leakage: B7
 - .3 Wind Load Resistance: C5
 - .4 Condensation Resistance Factor: fixed frame: 60 minimum
 - .5 Glass: 59 minimum
- .3 Window shall also meet the requirements for blocked operation, ease of operation, sash strength, stiffness and resistance to forced entry.
- .4 Submit test reports from a recognized Canadian Independent Testing Laboratory as well as manufacturer's certificate, certifying compliance with the above-noted requirements.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal recyclable packaging materials in appropriate on-site for recycling.
- .3 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.
- .4 Divert unused or damaged wood materials from landfill to recycling facility approved by Consultant.
- .5 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .6 Divert unused caulking material from landfill to official hazardous material collections site approved by Consultant.
- .7 Plastic caulking tubes are not recyclable and must not be diverted for recycling with other plastic materials.

1.9 WARRANTY

- .1 Submit a manufacturer's written warranty against defects in materials and workmanship covering the components of the window system for a period of five (5) years. The manufacturer shall supply a non-pro-rated warranty covering labour, materials, tools and equipment to repair and/or replace any materials defects at no additional cost, for a period of five (5) years including defects or failures due to poor workmanship and installation.

- .2 The supplier shall also submit a written warrantee, in accordance with Section 088050-Glazing, for ten (10) years warranting the sealed units against defects.

1.10 MAINTENANCE DOCUMENTS AND MATERIALS

- .1 Provide 2 copies of data for maintenance and routine cleaning.
- .2 Provide 2 copies of final record reviewed shop drawings for owner's records.
- .3 Contractor shall supply all accessories as may be required for the operation and performance of the windows system.

1.11 MOCK UP

- .1 Construct a window mock up in accordance with Section 01 45 00 – Quality Control. Allow 24 hours for inspection of mock-up by Consultant before proceeding with work. When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may not remain as part of finished work.”

Part 2 Products

2.1 MATERIALS

- .1 Extrusions shall be AA6063 T54 alloy and temper for framing.
- .2 Formed aluminum sheet and plate components shall be AA1100-H14 alloy and temper suitable for their purpose and finish.
- .3 Exposed anodized sheet and plate to AA5005-H14 alloy and temper or AA1100-H14 alloy and temper (anodizing quality, 1.6 mm thickness).
- .4 Non-exposed sheet and plate to AA3003-H14 alloy and temper, mill finish.
- .5 Fasteners shall be 300 series stainless steel or 400 series stainless steel cadmium plated and of sufficient size and quantity to perform their intended function.
- .6 Weathering and glazing gaskets shall be extruded, black, closed cell or dense elastomer of durometer appropriate to the function.
- .7 Glazing tapes shall be preformed polyisobutylene-butyl glazing tape with integral shim strip, 10-15 durometer, hardness, paper release, black color. Acceptable materials: Tremco Polyshim II by Tremco Ltd.
- .8 Exterior Sills: extruded aluminum, minimum 3 mm thick, complete with joint covers, complete with jamb drip deflectors on both sides of each sill (refer also to drawings for type), chairs, anchors, anchoring devices. All corners shall be ground or rounded to eliminate burrs and sharp edges. Sills to be one continuous piece along sill of window. Review installation with the consultant prior to caulking.
- .9 Sealants: shall be in accordance with Section 07900. Colours to Consultant's selection to either match building materials or window frame.

- .10 Foam Backer Rod: to be extruded, closed cell foam, round polyethylene rope, minimum 25% wider than width of joint cavity to be caulked. To be compatible with primers and sealants.
- .11 Void filler foam: one part expanding polyurethane closed cell foam by BASF, Hilti or approved alternate specifically designed for window applications. To be compatible with primers and sealers
- .12 Bedding Compound: to CGSB 19-GP-14M.
- .13 Isolation Coating: alkali resistant bituminous paint.
- .14 Vandal Screens: if called for on drawings, prefinished metal vandal screens shall be by Armoured Guard Security Screens Inc. Tel. 1 877-372-7336. Colour as selected by Architect.

2.2 FABRICATION

- .1 Fabricate in accordance with CSA-A440/A440.1 supplemented as follows:
- .2 Fabricate framing from extrusions of size and shape shown on shop drawings. Interior and exterior extruded aluminum framing sections shall be integrated with a glass reinforced nylon thermal break to form a rigid composite assembly without the use of fasteners or other thermal bridging elements.
- .3 Composite frame assembly shall have a minimum of 1100 lbf/4 in. (4815N/ 100 mm) resistance to shear between the aluminum and the thermal break materials.
- .4 Dry shrinkage of the thermal break shall not exceed 0.1% of the framing member length.
- .5 Fixed framing shall be designed for screw spline corner construction. 518 ISOPORT frameless vent operating sash extrusions shall be tubular with mitred, clip, adhesive , stake joint construction.
- .6 All framing joints shall be accurately machined, assembled, and sealed to provide neat weather tight connections. Coupling mullions shall be designed to provide a functional split to permit modular construction and allow for thermal expansion. Glass stops shall be aluminum and lock-in screwless type.
- .7 All glazing pockets shall be vented, pressure equalized and drained to the exterior.
- .8 Elastomeric air seal gasket shall be installed around the full perimeter of glass and sealed at corners wit silicone sealant. Air seal gasket must provide adhesion with silicone sealant.

2.3 ALUMINUM FINISHES

- .1 Exposed aluminum sections and infill panels or interior column covers, if any, shown on drawings be given an anodic oxide treatment in accordance with Aluminum Association specification AA-M12C22A31. and CAN/CSA-A440 clear anodized Class II, 10µm (.0004 inch.) in accordance with AAMA 611.

- .2 For exterior spandrel panels –if required on the project, to be a clear anodized infill panel to match windows finish complete with solid support substrate and insulation layer, clear anodized aluminum smooth or textured finish to Consultant selection.
- .3 Allow for three (3) additional colours of infill panels other than anodized. Enamel finish shall be PPG Duranar finish (Kynar 500), 10,000 series or approved alternate.
- .4 Final approval of finish and colour to be made by Consultant.

2.4 HARDWARE

- .1 Hinging hardware shall be 4 bar concealed hinge 301 Series Heavy Duty Steel 4 bar hinges by Anderberg with positive stop and adjustable friction shoe. Following review window operator location conditions on site, install metal bar restrictors to each hinge at jamb to allow maximum 225 mm opening. only following Consultant direction. Sash projection shall not extend past exterior plane of building wall
- .2 For bottom hinged open-in vents, where shown, provide solid cast cam handles and keepers in white satin bronze. Do not cut cam handles to fit sash profiles. Where possible secure cam handles with fastenings concealed from view at underside of frame for top hinged units. Provide a minimum of two (2) solid bronze or stainless steel cam handles per awning unit.
- .3 For top hinged/side hinged open out sashes provide roto-operators.
- .4 If shown on drawings, provide Teleflex mechanical operators and manual crank operating system for all windows where cams are required to be higher than 1800 above finished floor. Refer to drawings for locations.

2.5 INSECT SCREENS

- .1 Fly screens: Provide to all operable units meeting CGSB 79-GP-1M and CSA/CAN-A440 rating heavy duty shall consist of extruded aluminum frame having a wall thickness of 1.9 mm, finish to match windows. Screen cloth shall be 18 x 14 aluminum mesh.

2.6 ISOLATION COATING

- .1 Isolate aluminum from following components, by means of isolation coating:
 - .1 Dissimilar metals except stainless steel, zinc, or white bronze or small area.
 - .2 Concrete, mortar and masonry.
 - .3 Wood.

2.7 GLAZING

- .1 Prepare windows to receive 25 mm thick double glazed insulating glass specified under Section 088050 – Glazing. Glaze windows in accordance with CSA-A440/A440.1.

2.8 THRU-WALL FLASHING

- .1 Sub-sill flashings to be Blueskin SA by Bakor in locations shown on drawings. Adhere to substrate using primer approved by manufacturer. Ensure clean-up of excess primer and no visible edges of flashing upon completion of the work.

2.9 EXTRUDED SILLS

- .1 Sills are to be a minimum of 7 degree (7°) downward slope and integral drip which extends a minimum of 25 mm from the face of the wall cladding.
- .2 Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces. Break form shapes are not permitted.

2.10 ALUMINUM PANNING

- .1 Panning to be extruded aluminum minimum 1.6 mm thick with pre-coated finish to be identical process and match to aluminum frames and sills. Break form shapes are not permitted.
- .2 Submit samples of panning along with samples of other extrusions and materials.
- .3 Metal panning to be designed to lock into new window frames and have true flat planes with no twists, buckles dents, “oil canning” or other similar visual defects caused by manufacturing or handling.

Part 3 Execution

3.1 PREPARATION

- .1 Protect adjacent surfaces from damage resulting from work under this specification.

3.2 WINDOW INSTALLATION

- .1 Install in accordance with CSA-A440/A440.1.
- .2 Arrange components to prevent abrupt variation in colour.
- .3 Install the windows in accordance with the manufacturer’s instructions. Install the windows plumb, level and true relative to building structure. Do not exceed 3mm in 3050 mm (1/8” in 10’0”) variation from plumb and level. Foam insulate between the frame members and the window opening using a single component polyurethane foam, insulating sealant.

3.3 SILL INSTALLATION

- .1 Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces. Ensure integral end caps are secured with no burrs or exposed sharp edges and do not require excessive caulking due to profiles at jamb. Break form shapes are not permitted. Include sill end dams of same material. Ensure no sharp edges.

3.4 CAULKING

- .1 Seal joints between frame members and other non-operating components with sealant to provide weathertight seal at outside.
- .2 Seal joints between windows and window sills with sealant. Bed sill expansion joint cover plates and drip reflectors in bedding compound. Caulk between sill upstand and window-frame. Caulk butt joints in continuous sills.
- .3 Apply sealant in accordance with Section 07 92 10 - Joint Sealing. Conceal sealant within window units except where exposed use is permitted by Consultant.
- .4 Interior trims and sealant not to be applied until installed window has been inspected and approved by Consultant.

3.5 CLEAN UP

- .1 Clean glass at the factory. For final cleaning of glass to remove job site soiling refer to Section 088050 - Glazing. Leave all surfaces clean, free from sealants, caulking or other foreign material. Remove all surplus materials and debris resulting from the work of this Trade.
- .2 Refer to other sections for requirements to make good all finishes.

3.6 PROTECTION

- .1 Aluminum shall be isolated from concrete, mortar, plaster or dissimilar metals with bituminous paint or epoxy solution. Framing shall be protected from other building materials during and after installation until acceptance.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 1
- .2 Section 08 11 14 – Metal Steel Doors and Frames.
- .3 Section 08 14 10 – Laminate-faced Flush Wood Doors.
- .4 Section 16 – Electrical wiring for magnetic strikes, hold open devices, electric releases and electric locks.

1.2 SECTION INCLUDES

- .1 For continuity and ready reference, this section is provided to describe intention regarding hardware supply and installation. The General Contractor will be required to coordinate the various sub-consultants regarding door and hardware installation and ensure that specific roles and scope delineations are clear.
- .2 Hardware Supply: **The door hardware supply and installation shall be by a specialist hardware supplier as an allowance identified by the Consultant, to be tendered separately.**

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 11 – Final Cleaning.
- .3 Section 01 78 00 - Closeout Submittals
- .4 Section 08 11 14 – Metal Doors and Frames.
- .5 Section 08 50 50 – Aluminum Windows.
- .6 Section 07 92 10 - Joint Sealing: caulking of joints between frames and other building components.
- .7 Section 10 28 10 – Toilet, Bath and Laundry Accessories.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI).
 - .1 ANSI/ASTM E330-[02], Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM C542-[94(1999)], Specification for Lock-Strip Gaskets.
 - .2 ASTM D790-[02], Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - .3 ASTM D1003-[00], Test Method for Haze and Luminous Transmittance of Plastics.
 - .4 ASTM D1929-[96(R2001)e1], Test Method for Determining Ignition Temperature of Plastics.
 - .5 ASTM D2240-[02b], Test Method for Rubber Property - Durometer Hardness.
 - .6 ASTM E84-[01], Test Method for Surface Burning Characteristics of Building Materials.
 - .7 ASTM F1233-[98], Test Method for Security Glazing Materials and Systems.
- .3 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-12.1-[M90], Tempered or Laminated Safety Glass.
 - .2 CAN/CGSB-12.2-[M91], Flat, Clear Sheet Glass.
 - .3 CAN/CGSB-12.3-[M91], Flat, Clear Float Glass.
 - .4 CAN/CGSB-12.4-[M91], Heat Absorbing Glass.
 - .5 CAN/CGSB-12.5-[M86], Mirrors, Silvered.
 - .6 CAN/CGSB-12.6-[M91], Transparent (One-Way) Mirrors.

- .7 CAN/CGSB-12.8-[97], Insulating Glass Units.
- .8 CAN/CGSB-12.9-[M91], Spandrel Glass.
- .9 CAN/CGSB-12.10-[M76], Glass, Light and Heat Reflecting.
- .10 CAN/CGSB-12.11-[M90], Wired Safety Glass.
- .11 CAN/CGSB-12.12-[M90], Plastic Safety Glazing.
- .12 CAN/CGSB-12.13-[M91], Patterned Glass.
- .13 CAN/CGSB-12.1-M90 Tempered or Laminated Safety Glass
- .14 CAN/CGSB-12.3-M76 Glass, Polished Plate or Float, Flat, Clear
- .4 Canadian Standards Association (CSA International).
 - .1 CSA A440.2-[98], Energy Performance Evaluation of Windows and Sliding Glass Doors.
 - .2 CSA Certification Program for Windows and Doors [2000].
- .5 Environmental Choice Program (ECP).
 - .1 CCD-045-[95], Sealants and Caulking.
- .6 Flat Glass Manufacturers Association (FGMA).
 - .1 FGMA Glazing Manual - [1997].
- .7 Laminators Safety Glass Association (LSGA).
 - .1 LSGA Laminated Glass Design Guide [2000].

1.3 SAMPLES

- .1 Submit a 300 x 300 sample of all glass products in accordance with Section 01 33 00 - Submittal Procedures.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 013300 – Submittal Procedures. Coordinate location with Consultant.

1.5 WARRANTY

- .1 Contractor hereby warrants glass against defects and failure, including leakage, under normal conditions of use, in accordance with the Contract, but for ten (10) years total, as follows:
 - .2 Supplier shall submit a written warranty from the insulated glass manufacturer to replace or repair any defects in materials or sealed units for a period of ten (10) years from the date of Substantial Completion.
- .3 Mirrors:
 - .1 Submit a warranty for mirrors, covering the repair or replacement of defective work in accordance with the Contract, but for five (5) years total.
 - .2 Warranty shall apply against defects in workmanship and materials and, against silver deterioration and loosening of fastenings.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal [paper] [plastic] [polystyrene] [corrugated cardboard] packaging material [in appropriate on-site] for recycling.
- .3 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.
- .4 Divert unused or damaged wood materials from landfill to [recycling] [reuse] [composting] facility approved by Consultant.
- .5 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .6 Divert unused caulking material from landfill to official hazardous material collections site approved by Consultant.
- .7 Plastic caulking tubes are not recyclable and must not be diverted for recycling with other plastic materials.

Part 2 Products

2.1 MATERIALS

- .1 Acceptable Manufacturers:
 - .1 AFG Glass Inc
 - .2 Libby-Owens Ford
 - .3 PPG Industries
- .2 Exterior Tempered Safety Glass: All exterior Vision Glass to exterior windows, curtain wall and non-fire-rated screens to be sealed insulated units conforming to CAN/CGSB-12.8. Exterior lite 6mm tempered clear glass, Solarban 70 Low Emissivity Coating on inner pane (2nd surface), 13mm Argon filled air space, inner lite 6 mm clear tempered glass.
 - .1 All tempered glass to conform to CAN2-12.1 M-90 Type 2 tempered glass, Class B Double glazed units to have an integral non-metallic space creating a 13 mm hermetically sealed Argon filled air space. Spacers shall be continuous with butt joints (if any) at corners only. Pieces are not permitted. Butyl based spacers are not permitted.
- .3 Polished Plate or Float Glass: To CAN/CGSB-12.3 clear.
- .4 Spandrel Glass (SP): CAN/CGSB-12.9-M, 6 mm thick unless otherwise indicated, with water-based silicone emulsion coating applied to backside, 'Opaci-Coat 300' by ICD High Performance Coatings or approved alternative. Colour: To be selected by the Consultant.
- .5 Fire Rated Glazing ('FR' 'FRG' or 'GW'): Fire rated glazing to be impact safety rated, intumescent laminated glazing to meet required fire resistance rating. Coordinate

glazing thickness with screen frame manufacturer. Refer to drawing A01 "Fire Separations Plans & OBC Data Matrix" for fire separation ratings. Intumescent laminated glazing to be supplied by:

- .1 Fireswiss "Fireswiss Foam C44++" (for 3/4 hour rating) by GLASSOPOLIS
- .2 Pyrostop "Pyrostop 45" (for 3/4 hour rating) by TECHNICAL GLASS PRODUCTS
- .6 Georgian Wired rated glazing: not to be used on this project.
- .7 Mirrors: Refer to Section 10 28 10 Washroom Accessories.
- .8 Setting blocks: neoprene, 80 durometer hardness, 102 mm x 6 mm width to suit glass to extend from the fixed stop to the opposite face of the glazing unit.
- .9 Spacer Blocks: neoprene, thickness to provide a minimum glass to face clearance of 3mm.
- .10 Glazing tape: preformed polyisobutylene-butyl glazing tape with integral shim strip, 10-15 durometer, hardness, paper release, black color. Acceptable materials: Tremco Polyshim II by Tremco Ltd. or approved alternate.
- .11 Gasket: black neoprene "U" cavity type with lock strip.
- .12 Sealant: one component silicone, Spectrem 2 by Tremco Ltd. Refer to Section 07900.
- .13 Display cases: shelves to be 13mm tempered glass with polished rounded edges. Doors to be tempered 8mm tempered glass. Coordinate sizes and provide to Section 06 40 00 for installation.

2.2 FABRICATION

- .1 Fabricate in accordance with CSA-A440/A440.1 supplemented as follows:
- .2 Make field measurements before cutting and assembling materials.
- .3 Maintain minimum bite or lap of glass as recommended by the glazing unit manufacturer.
- .4 Each glass lite shall be labeled with the name of the product, weight and quality and year manufactured.
- .5 If requested, provide owner or consultant access to the plant or shop to review fabrication. Consultant or owner to provide 24 hour advance notice of visit.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 EXAMINATION

- .1 Verify that openings for glazing are correctly sized and within tolerance.
- .2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.3 PREPARATION

- .1 Clean contact surfaces with solvent and wipe dry.
- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .3 Prime surfaces scheduled to receive sealant.

3.4 INSTALLATION:

- .1 Inspect all glazing channels prior to application. All openings in joints and channels to be sealed shall be clean, dry and free of dust, oil, grease, loose mortar or any foreign material.
- .2 All surfaces to receive glazing tape shall be wiped dry with a clean rag dampened in Xylol, followed by a dry wipe.
- .3 Examine all sashes prior to glazing to determine if the openings are square and plumb. Any butt and miter joints which are open shall be sealed prior to glazing. Adjust all operating sashes and glaze in the closed position.
- .4 Compression Glazing:
 - .1 When butt joint is in a vertical direction, the glazier shall first run the tape on the head and sill members while going over the joint. If joints at the sash run horizontally, the tape must be applied first to the jambs so that it crosses over the joint.
 - .2 When an offset condition exists at each corner where a horizontal member passes behind vertical mullions, two different sized tapes shall be used to equalize the pressure seal. The thinner tape is to applied first on the glazing leg closest to the interior. The thicker tape shall be cut to the length between the two tapes and applied.
 - .3 Each section of tape shall butt the adjoining tape and be united with a tool to eliminate any openings. Lapping of the adjoining tapes at the corners is not permitted.
 - .4 Remove paper backing just prior to setting glass and apply a toe bead of sealant 150 mm long in each of the corners.
 - .5 Position one setting block at the quarter point of each corner on the sill members or as recommended by IGMA guidelines.
 - .6 Set the glass on the setting blocks and press firmly in place. Snap in the interior glazing stops.
 - .7 Set the spacer blocks to prevent any "walking" of the lite.
- .5 Mirrors:

- .1 Install mirrors by means of concealed vandalproof clips. If clips are used, install cushioning tape completing around perimeter of mirror back, set in concealed location within 25 mm of edge. Install fixed mirrors in washrooms at two different heights as indicated on drawings.
- .2 Follow manufacturer's installation recommendations.
- .6 Install any wired glass with the wire parallel to the opening.
- .7 Replace any loose glazing stops and tighten all screws.
- .8 Contractor shall include for needle point (cap beads) at all lower horizontal rail joints of all sash/glazing units at the discretion of and as may be requested by the Consultant or owner.

3.5 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Remove traces of primer, caulking.
- .3 Remove glazing materials from finish surfaces.
- .4 Remove labels after work is complete.
- .5 Immediately upon job completion and when sealants have cured, remove any temporary protection and clean all exposed interior and exterior surfaces. Use proper cleaning materials only which will not harm the window components or any adjacent surfaces.
- .6 Ensure all temporary labels have been removed and fully cleaned.
- .7 Mirrors:
 - .1 Clean mirrors using non-abrasive soap or detergent and rinse with clean water. Leave in clean, polished condition for Owner occupancy.

3.6 INSPECTION

- .1 Where inspection is called for elsewhere in the specification, perform Window air and water leakage test to ensure installation meets performance requirements stated herein. Should test fail, take remedial measures and re-test a different location at not additional cost to the owner until the test passes.

END OF SECTION

1 General

1.1 **SECTION INCLUDES**

- .1 Labour, Products, equipment and services necessary for terrazzo restoration Work in accordance with the Contract Documents.

1.2 **REFERENCES**

- .1 CSA A23.1, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
- .2 CAN/CSA A3000, Cementitious Materials Compendium.
- .3 TTMAC, Terrazzo, Tile and Marble Association of Canada

1.3 **SUBMITTALS**

- .1 Product data:
- .1 Submit duplicate copies of manufacturer's Product data in accordance with Section 01 33 00 indicating:
- .1 Performance criteria, compliance with appropriate reference standard(s), characteristics, limitations, and trouble-shooting protocol.
- .2 Product transportation, storage, handling and installation requirements.
- .2 Shop drawings:
- .1 Submit shop drawings in accordance with Section 01 33 00 indicating:
- .1 Terrazzo layout.
- .2 Perimeter conditions, junctions with dissimilar materials.
- .3 Setting details.
- .3 Certificates: Submit manufacturer's certificates stating that materials supplied are in accordance with this specification.
- .4 Closeout submittals: Submit recommended maintenance instructions and listing of recommended maintenance Products for incorporation into Operations and Maintenance Manuals in accordance with Section 01 78 23.

1.4 **QUALITY ASSURANCE**

- .1 Installer qualifications: Perform Work of this Section by a company that has expertise and proven experience in the installation of terrazzo units of a similar size and nature.

1.5 **SITE CONDITIONS**

- .1 Do not install Work of this Section outside of the following environmental ranges without the Consultant's and Product manufacturer's written acceptance:
 - .1 Ambient air and surface temperature: 15⁰C to 45⁰C.
 - .2 Precipitation: None.
- .2 Install temporary protection and facilities to maintain the Product manufacturer's, and specified, environmental requirements for 7 Days before, during, and 7 Days after installation.

2 Products

2.1 **MATERIALS**

- .1 Cement: Portland cement to meet specified requirements of CAN/CSA A3000, Normal or High-Early strength. Use white portland cement in white matrix.
- .2 Sand: To meet specified requirements of CSA A23.1, sharp, screened, washed. Use white sand in white matrix.
- .3 Water: Potable, free from acids, alkalies, oil, or organic materials.
- .4 Divider Strips: To match existing material and size.
- .5 Topping:
 - .1 Marble Chips: To meet specified requirements of Terrazzo, Tile and Marble Association of Canada, match existing size gradation and colour.
 - .2 Colour pigments: Pure mineral, alkali-resistant, non-fading, colour to match existing.
- .6 Cleaner: To meet specified requirements of #1000 Series of Terrazzo, Tile and Marble Association of Canada.
- .7 Sealer: To meet specified requirements of #2000 Series of Terrazzo, Tile and Marble Association of Canada.
- .8 Floor Finish: To meet specified requirements of Type #3001 of Terrazzo, Tile and Marble Association of Canada.
- .9 Curing Agent: Non-staining, maximum moisture retention 0.015 grams, to meet specified requirements of Terrazzo, Tile and Marble Association of Canada.

2.2 **MIXES**

- .1 Underbed:
 - .1 One part cement to four parts sand by volume.

- .2 Add water to product stiff mix, but use no more than four gals/80 lb. bag of cement to make workable.
- .2 Topping:
 - .1 Marble chip aggregate and cement mixed dry with colour pigments to match existing. Grind a small area to determine the true colours of existing terrazzo and chip gradation.
 - .2 Water shall not exceed 18 L /bag of cement.
 - .3 Prepare topping by mechanical mixing with materials added in the following order: one-half of aggregate, total of cement, water, remaining aggregate.
- 3 Execution
- 3.1 **EXAMINATION**
 - .1 Ensure that environmental conditions and backing surfaces have been provided according to specified requirements. Do not proceed with work until satisfied that installation will meet specified standard.
- 3.2 **PREPARATION**
 - .1 Take extreme care that surfaces adjacent to terrazzo work are protected from staining by terrazzo materials, and that slurry is not tracked into other building areas any time during installation.
 - .2 Verify condition and dimensions of previously installed Work upon which this Section depends. Report defects to Consultant. Commencement of Work means acceptance of existing conditions.
 - .3 Sweep backing surfaces clean of all loose materials, and remove the debris. Clean off contaminants which would cause a defective installation.
 - .4 Locate and prepare for equipment or accessories recessed in finished terrazzo work.
 - .5 Cut terrazzo at panel joints where repair/extension is required.
- 3.3 **INSTALLATION**
 - .1 General:
 - .1 Installation shall match existing type. Profile of base shall match existing. Where bases are of different profiles, install new base of profile to match finished installation.
 - .2 When patching terrazzo, extend area to nearest divider strip in all directions.
 - .2 Underbed for Bonded Installation:
 - .1 Wet backing surfaces with water, remove excess, and when surface water has dried, slush into soaked backing a neat portland cement grout.

.2 Immediately following application of grout, place underbed, spread evenly, and screed to true levels to receive specified topping.

.3 Divider Strips:

- .1 Install divider strips in underbed while it is still semi-plastic.
- .2 Locate divider strips accurately. Set them straight, aligned, to line up with existing and at correct level; make junctions tight; and firmly trowel them along edges into underbed to ensure anchorage.
- .3 Set edging strips at junctions with other floor finishes to provide precisely for their thicknesses and finished levels after grinding. At openings set edging strips under doors.
- .4 Extend divider strips at right angles across borders.

.4 Placing of Topping:

- .1 Let underbed cure for at least 24 hours.
- .2 Wet top of underbed with water, remove excess, and when surface water had dried slush into soaked underbed a neat Portland cement grout of same colour cement and pigment as for matrix.
- .3 Apply topping to slurry or underbed while it is still wet.

3.4 TOPPING

.1 Standard Finish:

- .1 Into wet topping surface of floors, sprinkle wet aggregate of same materials in same proportions as specified for topping.
- .2 Apply so that finish surfaces match existing.

.2 Surface Preparation:

- .1 After finish aggregates are added, immediately roll floor topping with a heavy roller to compact and to remove excess water and cement. Pack bases.
- .2 Hand trowel all terrazzo surfaces to expose divider strips level with topping.

.3 Curing:

- .1 Cure topping for a minimum of six days following placing.
- .2 Cure to ensure that topping is kept damp until cement is hydrated.
- .3 Use wet mats or sand, paper or plastic sheets, or liquid curing compound.

3.5 FINISHING

- .1 Grind terrazzo surfaces by machine. Hand rub places inaccessible to grinding machines.
- .2 Constantly flood surfaces with water during grinding.
- .3 For initial grinding, use 24 to 60 grit carborundum stones.
- .4 After initial grinding, wash surfaces clean, remove all residue from holes and voids, and thoroughly rinse with only water.

- .5 Trowel plastic grout, of same mix and colour as matrix, into holes and voids of wetted surface, and remove excess. When grout begins to set, work it into holes and voids with burlap or excelsior pads, and remove excess.
- .6 Cure grout for a minimum of 48 hours as specified above for curing.
- .7 Give final grinding with 120 grit stones and water.
- .8 Wash off surfaces thoroughly after grinding.
- .9 Provide carborundum strips on landings at stariwells as shown on drawings.

3.6 **SITE TOLERANCES**

- .1 Finish surfaces shall be level or straight within a tolerance of 1.6 mm between division strips.

3.7 **REPAIR**

- .1 Before Project completion, remove and replace defective, off-colour, and damaged work. Defective work shall include areas where distribution of surface aggregate is visually different from surrounding area. Removed areas shall be completely bounded by divider strips or edges. RegROUT and regrind surfaces left with open fissures and holes.

3.8 **CLEANING**

- .1 Scrub terrazzo surfaces with an abundance of clean water. Use machine scrubbers where possible for floors.
- .2 Rinse with clean water and allow to dry.
- .3 Remove dust with heavy-duty vacuum cleaner.
- .4 If further cleaning is required, use Terrazzo, Tile and Marble Association of Canada #1001 cleaner in accordance with their specifications.
- .5 Sealing:
 - .1 As soon as possible after final cleaning, apply a coat of sealer. Wipe off excess before it dries.
 - .2 Just before completion of Project, clean terrazzo, as specified above, and apply a second coat of sealer as before.
 - .3 Apply two coats of floor finish.

3.9

PROTECTION

- .1 Prevent all traffic and work on newly laid floors by barricading areas for at least 24 hours following installation.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 04 21 13 – Masonry
- .3 Section 09 22 16 – Non-structural Metal Framing.
- .4 Supply of access doors for mechanical and electrical devices in mechanical and electrical sections.

1.2 REFERENCES

- .1 Aluminum Association
 - .1 Designation for Aluminum Finishes-[1997].
- .2 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C36/C36M-[01], Specification for Gypsum Wallboard.
 - .2 ASTM C79/C79M-[01], Standard Specification for Treated Core and Non-treated Core Gypsum Sheathing Board.
 - .3 ASTM C442/C442M-[01], Specification for Gypsum Backing Board, Gypsum Coreboard, and Gypsum Shaftliner Board.
 - .4 ASTM C475-[01], Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - .5 ASTM C514-[01], Specification for Nails for the Application of Gypsum Board.
 - .6 ASTM C557-[99], Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
 - .7 ASTM C630/C630M-[01], Specification for Water-Resistant Gypsum Backing Board.
 - .8 ASTM C840-[01], Specification for Application and Finishing of Gypsum Board.
 - .9 ASTM C931/C931M-[01], Specification for Exterior Gypsum Soffit Board.
 - .10 ASTM C954-[00], Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
 - .11 ASTM C960/C960M-[01], Specification for Pre-decorated Gypsum Board.
 - .12 ASTM C1002-[01], Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 - .13 ASTM C1047-[99], Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
 - .14 ASTM C1280-[99], Specification for Application of Gypsum Sheathing Board.
 - .15 ASTM C1177-[01], Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 - .16 ASTM C1178/C1178M-[01], Specification for Glass Mat Water-Resistant Gypsum Backing Board.

- .3 Association of the Wall and Ceilings Industries International (AWEI)
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-[M86(R1988)], Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CAN/CGSB-71.25-[M88], Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.
- .5 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-[1988(R2000)], Surface Burning Characteristics of Building Materials and Assemblies.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in original packages, containers or bundles bearing manufacturers brand name and identification.
- .2 Store materials inside, level, under cover. Keep dry. Protect from weather, other elements and damage from construction operations and other causes.
- .3 Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal accessories and trim from being bent or damaged.

1.4 SITE ENVIRONMENTAL REQUIREMENTS

- .1 Maintain temperature minimum 10 degrees C, maximum 21 degrees C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.
- .2 Apply board and joint treatment to dry, frost free surfaces.
- .3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal [paper] [plastic] [polystyrene] [corrugated cardboard] packaging material [in appropriate on-site] for recycling.
- .3 Divert unused gypsum from landfill to gypsum recycling facility for disposal approved by Consultant.
- .4 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .5 Divert unused wood materials from landfill to [recycling] [composting] facility approved by Consultant.
- .6 Divert unused paint and caulking material from landfill to official hazardous material collections site approved by Consultant.

- .7 Do not dispose of unused paint and caulking materials into sewer systems, into lakes, streams, onto ground or in other locations where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

- .1 Standard board: to ASTM C36/C36M, 16 mm or 19 mm thick or as indicated, tapered edges.
- .2 Standard board: to ASTM C36/C36M, X Rated, 16 mm or 19 mm thick or as indicated, tapered edges.
- .3 Water-resistant board: to ASTM C630/C630M, 13 mm water resistant, tapered edges (WRGB in Finish Schedule). Reinforced cement board may be used in lieu of water-resistant gypsum board.
- .4 Abuse resistant/Fire rated: to CSA A82.27-M1977 Fire-Rated Type X, 5/8" thick, "Abuse Resistant Fire Code" gypsum board panels, tapered edges, by CGC, FibreRock interior AquaTuff panel. All gypsum board to have anti-microbial and anti-mould properties.
- .5 Moisture resistant sheathing: 13mm (1/2") DensShield as manufactured Georgia-Pacific.
- .6 All gypsum board to have Anti-Microbial and Anti Mold properties.
- .7 Nails: to ASTM C514.
- .8 Steel drill screws: to ASTM C1002.
- .9 Stud adhesive: to CAN/CGSB-71.25.
- .10 Laminating compound: as recommended by manufacturer, asbestos-free.
- .11 Concrete Anchors: Phillips Red Head TW-614 or equivalent. Do not use powder activated fasteners for ceiling support.
- .12 Tie Wire: #16 ga. galvanized soft annealed steel wire.
- .13 Caulking: Acoustical sealant.
- .14 38 mm thick mineral wool batts ULC labeled, if indicated on drawings.
- .15 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, 0.5 mm base thickness commercial sheet steel with G90 zinc finish, perforated flanges, and one piece length per location.
- .16 Sealants: in accordance with Section 07 92 10 - Joint Sealing.
- .17 Insulating strip: rubberized, moisture resistant, 3 mm thick closed cell neoprene strip, 12 mm wide, with self sticking permanent adhesive on one face, lengths as required.

- .18 Joint compound: to ASTM C475, asbestos-free.

2.2 ACOUSTIC INSULATION MATERIALS FOR ALL PARTITION WALLS

- .1 **Location: All interior Gypsum Board Partition walls:** Note that all walls extend to underside of Deck and shall be assembled with the following materials in addition to those specified above.
- .2 Acoustic insulation inside all GB partitions: AFB Acoustic Fire Bat by Roxul or equivalent product by Fibrex, or Quietzone by Owens Corning.
- .3 Steel deck closures: Emseal 25V Expanding Foam Sealant sized and shaped to fit flutes.
- .4 Acoustic Insulation: mineral fibre acoustical batt insulation, as specified under Section 07210. Thickness of 90% of wall assembly cavity depth; Acceptable products:
 - .1 Fibrex 'Sound Attenuation Fire Batt (SAFB)'
 - .2 Johns Manville 'Sound-SHIELD'.
 - .3 Roxul 'AFB'.
 - .4 Owens-Corning 'QuietZone'.
- .5 Acoustical sealant: CAN/CGSB-19.21-M87; non-skinning acoustic sealant, non-hardening type.
- .6 Fasteners: use mechanical fasteners to secure batts into position as recommended by manufacturer.

Part 3 Execution

3.1 ERECTION

- .1 Do application and finishing of gypsum board in accordance with ASTM C840 except where specified otherwise.
- .2 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C840 except where specified otherwise.
- .3 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .4 Install work level to tolerance of [1:1200].

3.2 APPLICATION

- .1 Do not apply gypsum board until bucks, anchors, blocking, sound attenuation, electrical and mechanical works are approved.
- .2 Apply single layer gypsum board to metal furring or framing using screw fasteners and laminating adhesive. Maximum spacing of screws 300 mm on centre.
 - .1 Single-Layer Application:

- .1 Apply gypsum board on ceilings prior to application of walls in accordance with ASTM C840.
- .2 Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.
- .2 Double-Layer Application:
 - .1 Install gypsum board for base layer and exposed gypsum board for face layer.
 - .2 Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250 mm.
 - .3 Apply base layers at right angles to supports unless otherwise indicated.
 - .4 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 250 mm with base layer joints.
- .3 Apply water-resistant gypsum board or cement board at all locations where wall tiles or special coating are to be applied, and adjacent to slop sinks or janitors closets if not constructed of Concrete Block. Apply water-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads. Do not apply joint treatment on areas to receive tile finish.
- .4 Apply gypsum board to concrete block surfaces, where indicated, using laminating adhesive.
- .5 Apply type X gypsum board where indicated, in accordance with U.L.C. requirements and with supplement to the National Building Code of Canada to obtain the required fire protection, fire rating and fire separation.
- .6 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.
- .7 Where indicated on drawings, staple blanket to wallboard in accordance with ULC design requirements. Blanket shall be continuous and tightly fitted between studs and at perimeter.
- .8 Install gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.
- .9 Install gypsum board with face side out.
- .10 Do not install damaged or damp boards.
- .11 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.
- .12 Where a floor or roof structural member interferes with an interior partition wall at which a smoke or fire separation is required, a gypsum board enclosure with a fire rating not less than required for the wall must be provided to continue the required, a gypsum board enclosure with a fire rating not less than required for the wall must be provided to continue the required separation to the floor or roof above (typical)

3.3 INSTALLATION

- .1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure [at [150] mm on centre] [using contact adhesive for full length].
- .2 Install casing beads around perimeter of suspended ceilings.
- .3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. [Seal joints with sealant.]
- .4 Construct control joints of [preformed units] [two back-to-back casing beads] set in gypsum board facing and supported independently on both sides of joint.
- .5 Provide continuous polyethylene dust barrier behind and across control joints.
- .6 Locate control joints [where indicated] [at changes in substrate construction] [at approximate [10] m spacing on long corridor runs] [at approximate [15] m spacing on ceilings].
- .7 Install control joints straight and true.
- .8 Construct expansion joints [as detailed], at building expansion and construction joints. Provide continuous dust barrier.
- .9 Install expansion joint straight and true.
- .10 Install cornice cap where gypsum board partitions do not extend to ceiling.
- .11 Fit cornice cap over partition, secure to partition track with two rows of sheet metal screws staggered at [300] mm on centre.
- .12 Splice corners and intersections together and secure to each member with 3 screws.
- .13 Seal with acoustical sealant at ceilings, floors, wall intersections and all penetrations such as electrical outlets.
- .14 Install access doors to electrical and mechanical fixtures specified in respective sections.
 - .1 Rigidly secure frames to furring or framing systems.
- .15 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.
- .16 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with Association of the Wall and Ceiling Industries (AWCI) International Recommended Specification on Levels of Gypsum Board Finish:
 - .1 Levels of finish:
 - .1 Level 0: No taping, finishing or accessories required.

- .2 Level 1: Embed tape for joints and interior angles in joint compound. Surfaces to be free of excess joint compound; tool marks and ridges are acceptable.
- .3 Level 2: Embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fastener heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable.
- .4 Level 3: Embed tape for joints and interior angles in joint compound and apply two separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.
- .5 Level 4: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.
- .6 Level 5: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; apply a thin skim coat of joint compound to entire surface; surfaces smooth and free of tool marks and ridges.
- .17 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
- .18 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.
- .19 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .20 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.
- .21 Apply one coat of white primer sealer over surface to be textured. When dry apply textured finish in accordance with manufacturer's instructions.
- .22 Mix joint compound slightly thinner than for joint taping.
- .23 Apply thin coat to entire surface using trowel or drywall broadknife to fill surface texture differences, variations or tool marks.
- .24 Allow skim coat to dry completely.
- .25 Remove ridges by light sanding or wiping with damp cloth.
- .26 Provide protection that ensures gypsum drywall work will remain without damage or deterioration at time of substantial completion.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 09 21 16 - Gypsum Board Assemblies.

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM C645-[00], Specification for Nonstructural Steel Framing Members.
 - .2 ASTM C754-[00], Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-1.40-[97], Primer, Structural Steel, Oil Alkyd Type.
- .3 Environmental Choice Program (ECP).
 - .1 CCD-047a -[98], Paints - Surface Coatings.
 - .2 CCD-048-[98], Surface Coatings - Recycled Water-borne.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal [paper] [plastic] [polystyrene] [corrugated cardboard] packaging material in appropriate on-site bins for recycling.
- .3 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.
- .4 Divert unused gypsum materials from landfill to recycling facility approved by Consultant.

Part 2 Products

2.1 MATERIALS

- .1 Non-load bearing channel stud framing: to ASTM C645, roll formed from 0.59mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum lath and metal lath. Knock-out service holes at 150 mm centres.
- .2 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 30 mm legs for floor track, 50 mm for ceiling track.
- .3 Metal channel stiffener: 38 mm size, 2 mm thick cold rolled galvanized steel.
- .4 Metal Accessories: CSA A82.30-1965 (R-1971).
- .5 “Unistrut” support channel framing, by Tyco Electrical and Metal Products.

Part 3 Execution

3.1 ERECTION

- .1 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum.
- .2 Place studs vertically at 400 mm on centre and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
- .3 Erect metal studding to tolerance of 1:1000.
- .4 Attach studs to bottom track using screws.
- .5 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .6 Install steel frames and anchor frames securely to studs using minimum of three (3) anchors per jamb for jambs up to 2100 mm high and a minimum of four (4) anchors per jambs for jambs over 2100 mm high.
- .7 Provide two (2) studs at each side of openings wider than stud centre specified.
- .8 Install, cut to length, piece of runner horizontally over door frames and at top and bottom of rough opening in glazed partitions.
- .9 Provide 38 mm x 89 mm vertical and horizontal wood studs secured between metal studs for attachments of bathroom fixtures, accessories, cabinet work, and other fixtures, including grab bars, towel rails, attached to steel stud partitions.
- .10 Install steel stud or furring channel between studs for attaching electrical and other boxes.
- .11 Extend all partitions to underside of deck above for sound and fire separation.
- .12 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs.

3.2 CEILING FURRING TO CANOPIES & CEILING PANELS

- .1 Provide to all interior and exterior canopies where shown to receive wood slat or plywood finishes.
- .2 Framing channel to be model P1000 (1-5/8") ; 12 ga.
- .3 For exterior locations provide with 4 m dia. Holes at 500 o.c. for drainage and hot dip galvanize.
- .4 Provide shop drawings for layouts.
- .5 Refer to drawings for locations.

3.3 ACOUSTICAL SEALANT

- .1 Apply acoustical sealant to all sills, headers, jambs and furring channels in contact with walls floors and ceiling deck as part of the acoustical insulation system for interior partitions. Refer to *Section 09 21 16 - Gypsum Board Assemblies*.

3.4 CEILING FURRING

- .1 Install runners level to tolerance of 3 mm over 3.5 m. Provide runners at interruptions of continuity and change in direction.
- .2 Frame with furring channels, perimeter of openings to accommodate access panels, light fixtures, diffusers, grilles, etc.
- .3 Furr for bulkheads within or at termination or ceilings.
- .4 Install furring channels at 400 mm o.c. maximum.

3.5 WALL FURRING

- .1 Install steel furring, as indicated.
- .2 Frame opening and around built-in equipment on four (4) sides with channels.
- .3 Box-in beads, columns, pipes, and around exposed services.

3.6 FIRE RATED ASSEMBLIES

- .1 If required, install Metal Stud System and Furring in accordance with appropriate ULC Design and with supplement to the National Building Code of Canada 1985.

3.7 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 07 92 10 - Joint Sealing.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI)
 - .1 ANSI A108.1-[99], Specification for the Installation of Ceramic Tile (Includes ANSI A108.1A-C, 108.4-.13, A118.1-.10, ANSI A136.1).
 - .2 CTI A118.3-[92], Specification for Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive (included in ANSI A108.1).
 - .3 CTI A118.4-[92], Specification for Latex Portland Cement Mortar (included in ANSI A108.1).
 - .4 CTI A118.5-[92], Specification for Chemical Resistant Furan Resin Mortars and Grounds for Tile Installation (included in ANSI A108.1).
 - .5 CTI A118.6-[92], Specification for Ceramic Tile Grounds (included in ANSI A108.1).
- .2 American Society for Testing and Materials (ASTM International) International
 - .1 ASTM C144-[99], Specification for Aggregate for Masonry Mortar.
 - .2 ASTM C 207-[91(1997)], Specification for Hydrated Lime for Masonry Purposes.
 - .3 ASTM C847-[95(2000)], Specification for Metal Lath.
 - .4 ASTM C979-[99], Specification for Pigments for Integrally Coloured Concrete.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-[M86(R1988)], Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CGSB 71-GP-22M-[78], Adhesive, Organic, for Installation of Ceramic Wall Tile.
 - .3 CAN/CGSB-75.1-[M88], Tile, Ceramic.
 - .4 CAN/CGSB-25.20-[95], Surface Sealer for Floors.
- .4 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000-[98], Cementitious Materials Compendium (Consists of A5-98, A8-98, A23.5-98, A362-98, A363-98, A456.1-98, A456.2-98, A456.3-98).
 - .2 CSA A123.3-[98], Asphalt Saturated Organic Roofing Felt.
- .5 Terrazzo Tile and Marble Association of Canada (TTMAC)

- .1 Tile Specification Guide 09300 [2000], Tile Installation Manual.
- .2 Tile Maintenance Guide [2000].

1.3 PRODUCT DATA

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Include manufacturer's information on:
 - .1 Ceramic tile, marked to show each type, size, and shape required.
 - .2 Chemical resistant mortar and grout (Epoxy and Furan).
 - .3 Cementitious backer unit.
 - .4 Dry-set Portland cement mortar and grout.
 - .5 Divider strip.
 - .6 Elastomeric membrane and bond coat.
 - .7 Reinforcing tape.
 - .8 Levelling compound.
 - .9 Latex-Portland cement mortar and grout.
 - .10 Commercial Portland cement grout.
 - .11 Organic adhesive.
 - .12 Slip resistant tile.
 - .13 Waterproofing isolation membrane.
 - .14 Fasteners.

1.4 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Base tile: submit 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile.
- .3 Floor tile: submit 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile.
- .4 Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, colour, and size.
- .5 Stair Accessories: submit duplicate samples of each trim.
- .6 Adhere tile samples to [11] mm thick plywood and grout joints to represent project installation.
- .7 Prepare a 2 m x 3m mock-up sample on site to ensure demonstration of installation details and quality control. Include stair accessories in mock-up.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in containers with labels legible and intact and grade-seals unbroken.
- .2 Store material so as to prevent damage or contamination.
- .3 Store materials in a dry area, protected from freezing, staining and damage.
- .4 Store cementitious materials on a dry surface.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal packaging material in appropriate on-site bins for recycling.
- .3 Unused adhesive, sealant and coating materials must be disposed of at an official hazardous material collections site as approved by the Consultant.
- .4 Unused adhesive, sealant and coating materials must not be disposed of into the sewer system, into streams, lakes, onto the ground or in other location where it will pose a health or environmental hazard.
- .5 Broken ceramic materials must be diverted from landfill to a local facility as approved by Consultant.

1.7 ENVIRONMENTAL CONDITIONS

- .1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12 °C for 48 h before, during, and 48 h after, installation.
- .2 Do not install tiles at temperatures less than 12 °C or above 38 °C.
- .3 Do not apply epoxy mortar and grouts at temperatures below 15 °C or above 25 °C.

1.8 EXTRA MATERIAL

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide minimum 5% of each type and colour of tile required for project for maintenance use. Store where directed.
- .3 Maintenance material to be of same production run as installed material.

1.9 EXTENDED WARRANTY

- .1 Submit a warranty for entire wall tile installation, covering materials and labour and the repair or replacement of defective work in accordance with the Contract, but for three (3) years total.

Part 2 Products

2.1 FLOOR TILE

- .1 Porcelain floor tile (Designation: POR): to CAN/CGSB-75.1.
 - .1 Acceptable Materials: Size 300 mm x 600 mm; 'Oh!Take' by Centura in 'Heaven' colour.

- .2 Locations: corridors, vestibules and washrooms – refer to drawings. Refer to Room Finish Schedule for locations.
 - .3 Install in a one-third staggered pattern.
 - .4 Provide prefabricated movement joints in conjunction with slab saw cuts approx. 3500-6000mm distance (refer to floor pattern drawing).
- .2 Porcelain floor tile bull-nose base (Designation: POR): to CAN/CGSB-75.1.
- .1 Acceptable Materials: Size 76mm or 100 mm x 300 mm ‘sit-on’ bull-nose base; “Vitra”, by Centura or “Omnia”, by Olympia Tile, “Ultra Modern” by Daltile, or “Anchorage” by Daltile, all in matte finish. Allow for two (2) colours from manufacturer’s Category/Group 2 colours.

2.2 WALL TILE

- .1 Ceramic tile (Designation: CWT): to CAN/CGSB-75.1, Type 5, Class MR 4, 100mm (4”) x 400mm (16”) x 6 mm size, glazed surface. Allow for three (3) colors or sheens. Thin-set application.
- .2 Acceptable Materials: “Rainbow”, by Centura. “Maple Leaf CDC”, by Olympia Tile or
- .3 Tile Edging: Purpose-made, anodized aluminum, polished chrome finish, metal edge strips as manufactured Schluter Systems at all exposed tile edging: Profile – JOLLY; thickness as required for tile and tile set. Provide square tile return to wall at tops and sides of tile areas in Vestibule 9, with purpose made outside edging.
- .4 Locations: In washrooms where shown on interior elevations or in Room Finish Schedule. Allow for 3 colours: 75% field and 25% accent. Patterns to be issued by Architect during construction.

2.3 TRIM SHAPES

- .1 Conform to applicable requirements of adjoining floor and wall tile.
- .2 Use slip resistant trim shapes for horizontal surfaces of showers, overflow ledges, recessed steps, shower curbs, drying area curbs, and stools.
- .3 Use trim shapes sizes conforming to size of adjoining field wall tile, including existing spaces, unless specified otherwise.
- .4 Internal and External Corners: Provide trim shapes as follows where indicated.
 - .1 Bullnose shapes for external corners including edges.
 - .2 Coved shapes for internal corners.
 - .3 Special shapes for:
 - .1 Base to floor internal corners to provide integral coved vertical and horizontal joint.
 - .2 Base to floor external corners to provide bullnose vertical edge with integral coved horizontal joint. Use as stop at bottom of openings having bullnose return to wall.
 - .3 Wall top edge internal corners to provide integral coved vertical joint with bullnose top edge.

- .4 Wall top edge external corners to provide bullnose vertical and horizontal joint edge.
- .5 Provide cove and bullnose shapes for where indicated and required to complete tile work.

2.4 MORTAR AND ADHESIVE MATERIALS

- .1 Manufacturer's of commercial mortar, grout and adhesive having Product considered acceptable for use:
 - .1 Mapei
 - .2 Laticrete
 - .3 Flextile
- .2 Walls: Mortarcrete Latex Mortar conforming to ANS1A118.4-1973, manufactured by L & M Ceramo Inc.
- .3 Floors:
 - .1 Cement Mortar: Mixture of 1 part Portland cement, 4 parts dry sand and 1/10 hydraulic lime. Materials shall conform to the following:
 - .2 Portland Cement: To CAN3-A, Type 10.
 - .3 Hydrated Lime: To ASTM C-206 or 207, Type 5.
 - .4 Sand: To CSA A82.56, passing 1.6 mm sieve.
 - .5 Water: Potable, containing no contaminants which cause efflorescence.
 - .6 Thin Set Mortar: field mixed, blended sand-Portland cement-latex mortar, "Kerabond/Keralastic by Mapei."
 - .1 Acceptable Alternates: "Laticrete 4237 distributed by Ceratec Inc., or Flextile 52 thin set.
 - .2 Latex Additive: "Cemtex" by Master Builders, Laticrete 2022" distributed by Ceratec Inc.,

2.5 GROUT

- .1 Colouring Pigments:
 - .1 Pure mineral pigments, limeproof and nonfading, complying with ASTM C979.
 - .2 Colouring pigments to be added to grout by manufacturer.
 - .3 Job coloured grout are not acceptable.
 - .4 Use in Commercial Portland Cement Grout, Dry-Set Grout, and Latex-Portland Cement Grout.
- .2 Chemical-Resistant Grout for Walls:
 - .1 Epoxy grout: to ANSI A108.1, having quality, colour and characteristics to match epoxy bond coat. Adhesive and grout by same manufacturer.
 - .2 Epoxy Grout: "Latapoxy SP-100" Stainless, chemical resistant epoxy grout by Laticrete International. Colour from manufacturer's full range. Alternate: Kerapoxy by Mapei.
- .3 Floors:

- .1 Polymer modified grout as manufactured by MAPEL.

2.6 ACCESSORIES

- .1 Stairs Nosings and Edge Trims:
 - .1 Stair nosing to be Schluter, TREP-S, Aluminum support with thermoplastic rubber insert (26mm), installed in conjunction with porcelain tile as per manufacturer's recommendations. Thermoplastic rubber insert piece colour to be selected by consultant.
 - .2 SCHIENE edge protection by Schluter, anodized aluminum to installed at all exposed stair tile edges. Mitre joints to suite stair angle. Size as required for tile and mortar bed.
- .2 Prefabricated Movement Joints: purpose made Schluter, Dilex-KSN aluminum, sized as required for tile and mortar bed. Colour to be selected by consultant. To be installed directly above slab saw-cuts. Refer to floor pattern drawing for locations.
- .3 Reinforcing mesh: 50 x 50 x 1.6 x 1.6 mm galvanized steel wire mesh, welded fabric design, in flat sheets.
- .4 Divider strips:
 - .1 Laminated strips, core 32 x 3 mm black neoprene, outsides (both sides) brass 32 x 1.29 mm complete with anchors, both sides spaced at 150 mm on centre.
 - .2 Brass complete with anchors, both sides spaced at 150 mm on centre.
- .5 Cleavage plane: [polyethylene film to CGSB 51-34] [No. 15 asphalt saturated felt to CSA A123.3].
- .6 Metal lath: to ASTM C847 finish, 10 mm rib at 2.17 kg/m².
- .7 Transition Strips: purpose made metal extrusion; stainless steel type.
- .8 Reducer Strips: purpose made metal extrusion; stainless steel type; maximum slope of 1:2.
- .9 Prefabricated Movement Joints: purpose made, having a Shore A Hardness not less than 60 and elasticity of plus or minus 40 percent when used in accordance to TTMAC Detail 301EJ.
- .10 Sealant: in accordance with Section 07 92 10 - Joint Sealing.
- .11 Floor sealer and protective coating: [to CAN/CGSB-25.20, Type [1] [2]] [to tile and grout manufacturers recommendations].

2.7 MIXES

- .1 Portland Cement:
 - .1 Scratch coat: 1 part portland cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand, 1 part water, [and latex additive where required]. Adjust water volume depending on water content of sand.

- .2 Slurry bond coat: portland cement and water mixed to creamy paste. Latex additive may be included.
- .3 Mortar bed for floors: 1 part portland cement, 4 parts sand, 1 part water. Adjust water volume depending on water content of sand. [Latex additive may be included].
- .4 Mortar bed for walls and ceilings: 1 part portland cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand and 1 part water. Adjust water volume depending on water content of sand. [Latex additive may be included].
- .5 Levelling coat: 1 part portland cement, 4 parts sand, minimum 1/10 part latex additive, 1 part water including latex additive.
- .6 Bond or setting coat: 1 part portland cement, 1/3 part hydrated lime, 1 part water.
- .7 Measure mortar ingredients by volume.
- .2 Dry set mortar: mix to manufacturer's instructions.
- .3 Organic adhesive: pre-mixed.
- .4 Mix bond and levelling coats, and grout to manufacturer's instructions.
- .5 Adjust water volumes to suit water content of sand.

2.8 PATCHING AND LEVELING COMPOUND

- .1 Portland cement base, acrylic polymer compound, manufactured specifically for resurfacing and levelling concrete floors. Products containing gypsum are not acceptable.
- .2 Have not less than the following physical properties:
 - .1 Compressive strength - 25 MPa.
 - .2 Tensile strength - 7 MPa.
 - .3 Flexural strength - 7 MPa.
 - .4 Density - 1.9.
- .3 Capable of being applied in layers up to 50 mm thick, being brought to feather edge, and being trowelled to smooth finish.
- .4 Ready for use in 48 hours after application.
- .5 Any requirement for skim coats and levelling of existing sub-floor surface, to achieve an acceptable surface for flooring installation, are part of the scope of the flooring sub-contractor.

2.9 TERRAZO FLOOR PATCHING

- .1 Where applicable, saw cut existing terrazzo floor and base as required and remove to nearest metal 'panel' joint to enable replacement at a full panel. Replace with terrazzo flooring to match existing as closely as possible. Provide sample to consultant for approval.

2.10 CLEANING COMPOUNDS

- .1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and levelling compounds and elastomeric waterproofing membrane and coat.
- .2 Materials containing acid or caustic material are not acceptable.

Part 3 Execution

3.1 WORKMANSHIP

- .1 Do tile work in accordance with TTMAC Tile Installation Manual 2000, "Ceramic Tile", except where specified otherwise.
- .2 Apply tile [or backing coats] to clean and sound surfaces.
- .3 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles.
- .4 Maximum surface tolerance 1:800.
- .5 Make joints between tile uniform and approximately [1.5 mm] wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.
- .6 Lay out tiles so perimeter tiles are minimum 1/2 size.
- .7 Install floor tiles as per pattern. Layout and install flash cove tile first, before floor tile, ensuring a flush edge on the horizontal surface by feathering to masonry walls as required to produce a straight line on the floor. Install floor tiles to pattern supplied by Architect at a later date. Contact consultant to review when approximately no more than 10 sq. m has been installed.
- .8 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .9 Make internal angles square, external angles rounded.
- .10 Make internal angles square, external angles chamfered at 45° with narrow tile strip.
- .11 Construct cove base, as described using all special pieces available for inside and outside corners.
- .12 For Floors: Use bull nose edged tiles at termination of wall tiles, except where tiles abut projecting surface or differing plane.
- .13 Seal grouted joints with sealer.
- .14 Keep building expansion joints free of mortar or grout.

- .15 For Walls: Use round edged tiles at termination of wall tile panels, except where panel abuts projecting surface or differing plane.
- .16 Install divider strips at junction of tile flooring and dissimilar materials.
- .17 Allow minimum 24 h after installation of tiles, before grouting.
- .18 Clean installed tile surfaces after installation and grouting cured.

3.2 FLOOR TILE

- .1 Install in accordance with TTMAC to applicable thinset detail.

3.3 STAIR TILE ACCESSORIES

- .1 Install all accessories specified per manufacturer's instructions using whole lengths.
- .2 Provide sample installation for architect for review.

3.4 FLOOR SEALER AND PROTECTIVE COATING

- .1 Apply in accordance with manufacturer's instructions.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 78 00 - Closeout Submittals.
- .3 Section 06 10 10/06101 - Rough Carpentry: Wood strapping.
- .4 Fabrication: to ASTM 365-78 and CAN/GSB-92.1-M77.
- .5 Installation: to ASTM C636-76, except where specified otherwise.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM E1264-[98], Classification for Acoustical Ceiling Products.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-[M86], Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.
 - .2 CAN/CGSB-92.1-[M89], Sound Absorptive Prefabricated Acoustical Units.
- .3 Canadian Standards Association (CSA)
 - .1 CSA B111-[74(R1998)], Wire Nails, Spikes and Staples.
- .4 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-[88(R2000)], Surface Burning Characteristics of Building Materials.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit two each 300 x 300 mm samples of each individual tile and grid type in accordance with Section 01340.

1.4 REGULATORY REQUIREMENTS

- .1 Fire-resistance rated floor/ceiling and roof/ceiling assembly: certified by a Canadian Certification Organization accredited by Standards Council of Canada.

1.5 DESIGN CRITERIA

- .1 Maximum deflection 1/360 of span to ASTM 365-78 deflection test.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan

1.7 ENVIRONMENTAL REQUIREMENTS

- .1 Permit wet work to dry before commencement of installation.
- .2 Maintain uniform minimum temperature of [15]⁰C and humidity of [20] - [40] % before and during installation.
- .3 Store materials in work area [48] hours prior to installation.

1.8 EXTRA MATERIALS

- .1 Provide extra materials of acoustic units in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide acoustical units amounting to [2] % of gross ceiling area for each pattern and type required for project.
- .3 Extra materials to be from same production run as installed materials.
- .4 Clearly identify each type of acoustic unit, including colour and texture.
- .5 Store where directed by Consultant.

Part 2 Products

2.1 MATERIALS

- .1 Acoustic units for suspended ceiling system: to CAN/CGSB-92.1.
- .2 Acoustic Ceiling Panels, Designation LAP: Acoustic Ceiling Panels, wet formed mineral fibre panels, by Armstrong World Industries Canada Inc., Mississauga. Colour: White; Types as noted below:
- .3 **Panel Types:**
 - .1 Type 1: LAP 1: 610 x 1220 mm x 15.9 mm thick; 'Fine Fissured' with medium texture, Square Lay-In, #1729; Location: For use in areas as indicated.
- .4 Acceptable alternates: similar purpose-designed high humidity ceiling panels by CGC Interiors, BPB Canada Inc. and Certainteed.
- .5 **Suspension system Type 1:** 23.8 mm (15/16") "Prelude XL" exposed tee bar grid, including wall moulding, by Armstrong. Colour: white. Acceptable alternate: similar suspension system by CGC Interiors, Oakville and Chicago Metal Corp. Grid sizes to suit ceiling panel types as shown on drawings.
- .6 **Perimeter Trim:** 4" 'Axiom' class trim or CGC 'Compasso' for edging at lower ceilings where indicated.
- .7 Suspension System for Radiant Panel Heaters: not applicable to this project.
- .8 Hangers: 2.6 mm galvanized soft annealed steel wire.

- .9 Accessories: splices, clips, retainers, etc., to complement suspension system components.
- .10 Adhesive: low VOC type recommended by acoustic unit manufacturer.
- .11 Staples, nails and screws: to CSA B111 non-corrosive finish as recommended by acoustic unit manufacturer.
- .12 Hold down clips: purpose made clips to secure tile to suspension system, approved for use in fire-rated systems.

Part 3 Execution

3.1 EXAMINATION

- .1 Do not install acoustical panels and tiles until work above ceiling has been inspected by Consultant.

3.2 INSTALLATION

- .1 Install acoustical panels and tiles in ceiling suspension system.
- .2 Install acoustic units parallel to building lines with edge unit not less than 50% of unit width.
- .3 Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.
- .4 Support suspension system main runners at 1200 oc maximum with hangers from structure. Assembly shall support super-imposed loads. Maximum permissible deflection, 1/360 of span.
- .5 Attach cross member to main runner to provide rigid assembly.
- .6 Install suspension assembly to manufacturer's written instructions.
- .7 Install flush edge moulding at junction of acoustic unit ceiling and other materials around entire length of joint. Secure to construction. Butt joints neatly, square and true in alignment.
- .8 Set acoustic units in place.
- .9 Set all ceiling levels by the use of transit or laser level.
- .10 Ensure all installations are clean upon owner acceptance. Be responsible for monitoring damage and soiling after installation and before owner occupancy. Prior to owner takeover, replace all tiles with damage, blemishes or soiling whether caused by subcontractor handling or post installation above-ceiling adjustments, balancing, cabling, etc.
- .11 Provide for Owner twelve (12) complete, undamaged ceiling tiles of each type, sealed and boxed. Leave in location as directed by Architect.

3.3 INTERFACE WITH OTHER WORK

- .1 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM F1303-[99], Specification for Sheet Vinyl Floor Covering with Backing.
- .2 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-ISO 14040-[97], Environmental Management - Life Cycle Assessment - Principles and Framework (Adopted ISO 14040:1997, first edition).

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300 mm long base, nosing, feature strips, treads, edge strips.

1.4 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 ENVIRONMENTAL REQUIREMENTS

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20° for 48 hours before, during and 48 hours after installation.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Do not dispose of unused sealant and adhesive materials into landfill. Divert materials to municipal hazardous materials depot approved by Consultant.
- .2 Divert unused metal and wiring materials from landfill to metal recycling facility approved by Consultant.
- .3 Remove from site and dispose of packaging materials at appropriate recycling facilities.

1.7 QUALITY ASSURANCE

- .1 Supplier shall be an established firm experienced in the field.
- .2 Installer:
 - .1 Flooring contractor experienced in the field and approved by the manufacturer.

- .2 Flooring contractor shall have manual instructions and be trained by the manufacturer and distributor.
- .3 Manufacturer's recommendations for the correct preparation, finishing and testing sub floor surface.

1.8 EXTENDED WARRANTY

- .1 Submit a warranty for all the installation of all resilient sheet flooring, covering materials and labour and the repair or replacement of defective work in accordance with the General Conditions of the Contract, but for seven (7) years total.

Part 2 Products

2.1 MATERIALS

- .1 Resilient Sheet Flooring (SF-R): Acceptable materials:
 - .1 Acceptable Materials:
 - .1 Gerflor, Mipolan Esprit as distributed
 - .2 Tarkett Johnsonite IQ Granit/Micro Granit
 - .3 Polyflor Classic Mystique PUR by
 - .2 Locations: classrooms and other areas noted in Room Finish Schedule.
 - .3 Allow for four (3) colours for manufacturer's full range.
- .2 Characteristics:
 - .1 Surface resistance: Unaffected by surface water and chemicals.
 - .2 Slip resistance tested in accordance with ASTM D2047 Static coefficient of friction: Dry 0.95, Wet 0.93.
 - .3 Meets ULC 102.2 Flame spread 5, Smoke developed 295.
 - .4 Wear Resistance: ASTM C501 Wear index 436.
 - .5 Static Load Limit: 500 PSI.
 - .6 Hygiene: Bacteriostat retards the growth of bacteria.
- .3 Self-Levelling Underlayment: "Ultraplan 1" by Mapei fast setting, polymer-modified; for over concrete, plywood, ceramic tile, old cutback adhesive, and old vinyl and vinyl composition flooring, feather edge to 1 1/2" (38 mm) for use to prepare floor at locations where existing flooring is not level. Flooring contractor is required to install self-levelling underlayment to their satisfaction to uphold required warranty.
- .4 Filler and Cover Former:
 - .1 As recommended by manufacturer to suit subfloor on which its material is installed and to suit vertical wall/floor junctions.
- .5 Primers and Adhesives: As recommended by manufacturer of material to suit subfloor condition.
- .6 Cleaner: Neutral chemical compound that will not damage sheet or affect its colour.
- .7 Welding Rod: PVC welding rod, colour to match resilient sheet flooring.

- .8 Cap strip: sized to suit application, type recommended by flooring manufacturer, Altro Stainless Steel Cap, mechanically fastened to wall.
- .9 Resilient base (RR): rubber, top set coved, 3 mm thick, rubber, 100 mm high minimum 1200 mm long, including premoulded end stops and external corners. Acceptable materials: non-shrink Rubber Wall Base with toe as manufactured by Johnsonite. Colours: Six (6) from full Johnsonite "Coloright" colour line.
- .10 Rubber Stair Tread/ Riser combination (RSTR): Minimum of 5 mm thick, visually impaired Round Raised Disk pattern, rubber one-piece tread/ riser combination with speckled pattern. Stair tread to be one piece, for full width of stair. Include contrast strip on stair nosing for visual impaired, including mid and upper landings. Acceptable materials: VIRTR-Rd, as manufactured by Johnsonite, ROPPE, Activa Rubber Flooring, Flexco or Nora Rubber Flooring. Stair tread with contrast edge strip and no upstand is to be inserted into floor tile at top stair at mid and top landings. Stair treads to be speckled using minimum three colours.
- .11 Rubber Tile at Stair Mid and Upper Landings (RT): Minimum of 5 mm thick, hammered finish rubber tile, 600mm x 600mm square. Stair tread with contrast edge strip and no upstand is to be inserted into floor tile at top stair at mid and top landings. Acceptable materials: Johnsonite, ROPPE, Activa Rubber Flooring, Flexco, or Nora Rubber Flooring. Tile to be marbled or speckled using three colours.
- .12 Tactile Warning Tile: Provide rubber tactile warning tiles in a contrasting colour to the field rubber tiles, to be installed as required by the OBC at the top of all stairs where flooring is being installed. Tactile warning tiles to be installed one full tread back from top tread nosing, 600mm deep x full width of stair. Acceptable materials: Johnsonite Tarkett, ROPPE, Activa Rubber Flooring, Flexco, or Nora Rubber Flooring. Tile to be marbled or speckled using three colours.

Part 3 Execution

3.1 SITE VERIFICATION OF CONDITIONS

- .1 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.

3.2 PREPARATION

- .1 Scope includes preparation of floor using self levelling coating and patching compound as required.
- .2 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .3 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
- .4 Remove or treat old adhesives to prevent residual, old flooring adhesives from bleeding through to new flooring and/or interfering with the bonding of new adhesives.
- .5 As required, seal concrete slab to resilient flooring manufacturer's printed instructions.

3.3 INSTALLATION

- .1 Install on a smooth, flat concrete finish, which will be achieved manually or mechanically.
- .2 Ensure concrete sub floor temperature to be maintained at a minimum of 70°F during installation and ensure the moisture content does not exceed 3 Lbs per 1000 Sq Ft per 24 hours or lower.
- .3 Paint game lines using approved game line paint primer and game line paint in strict accordance with the game line paint manufacturer's instructions.
- .4 Before proceeding with any work, inspect the sub floor surface and report, in writing, to the project manager and the General Contractor any visible defect on the surface, such as cracks, bumps, rough areas or variations in planarity.
- .5 This installation is to proceed on an existing concrete slab in addition to new concrete work as required for mechanical services. Ensure slab is adequately cured and free of moisture or contaminants. If necessary, as part of the work of this section, scarify existing surfaces to prepare surface for adhesive, or to meet manufacturer's installation requirements. Fill joints, cracks, and holes in these surfaces and level surface irregularities with filler. Remove prime paint and wire brush steel base surfaces.
- .6 Check for any grease, oil, paint, duct or any combination remaining on the concrete sub floor.
- .7 Before proceeding with installation, clean concrete surface to remove any dirt or foreign materials, rinse thoroughly and allow eight (8) hours minimum to dry, if required, sanding is necessary in all installations.
- .8 Fill any areas not meeting $\pm 1/8''$ in 10' for level before installation. This will insure levelness and proper adhesion of material.
- .9 Lay each material in accordance with manufacturer's specifications.
- .10 Weld joints on flooring and internal and external angles of coves using welding rod in matching plain colours, and the standard hot-air-welding technique.
- .11 Install standard rubber base at resilient sheet flooring locations.
- .12 Flash into drain openings; do not cut on surface at edge of drain cover. Coordinate with Division 15 for installation with suitable drain type and cover. Bond flooring to drain flange under clamping ring using epoxy adhesive.
- .13 Extend resilient sheet under all cabinet work and casework to the wall line.

3.4 CLEANING

- .1 Remove excess adhesive from floor, base and wall surfaces without damage.
- .2 Clean, seal and wax floor and base surface to flooring manufacturer's printed instructions.

3.5 PROTECTION

- .1 Protect new floors from time of final set of adhesive, with polyethylene or Kraft paper until final inspection.
- .2 Prohibit traffic on floor for 48 hours after installation.
- .3 Do not wax.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 78 00 - Closeout Submittals.
- .3 Section 09 22 16 - Non-structural Metal Framing.
- .4 Section 06 10 10 - Rough Carpentry: Wood strapping.
- .5 Section 09 51 13 – Acoustic panel Ceiling.
- .6 Section 04 21 13 – Masonry.
- .7 Section 06 40 00 – Architectural Woodwork.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM C423-[01], Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-[M86], Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CAN/CGSB-92.1-[M89], Sound Absorptive Prefabricated Acoustical Units.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA B111-[1974(R1998)], Wire Nails, Spikes and Staples.
- .4 Underwriter Laboratories of Canada (ULC)
 - .1 CAN/ULC-S702-[97], Thermal Insulation, Mineral Fibre, for Buildings.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit one 300 x 300 sample of acoustic panel.

1.4 ENVIRONMENTAL REQUIREMENTS

- .1 Commence installation after building enclosed and dust generating activities are completed.
- .2 Permit wet work to dry prior to commencement of installation.
- .3 Maintain uniform minimum temperature of 15°C and relative humidity of 20- 40% prior to, during and after installation.

1.5 WASTE MANAGEMENT

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, and corrugated cardboard, packaging material in appropriate on-site bins for recycling.

1.6 EXTRA MATERIALS

- .1 Provide acoustical units for maintenance use amounting to 2% of gross wall area for each pattern and type required for project.
- .2 Provide sufficient adhesive to install extra material provided.
- .3 Extra materials to be from same production run as installed materials.
- .4 Clearly identify each package of acoustical units including colour and type, and each container of adhesive.
- .5 Store where directed by Consultant.

Part 2 Products

2.1 MATERIALS

- .1 **Type 1: Tectum Acoustic Panels (TEC)**
 - .1 Tectum DesignArt Shapes – Pattern TDSH-0004
 - .2 Use only undamaged, single pieces. Material shall be ULC rated for fuel contributed, flame spread and smoke development in compliance with Ontario Building Code.
 - .3 Locations: to upper walls of Learning Commons x132 and Forum X136. Refer to interior elevation drawings.
 - .4 Colour: four colours to Architect's selection
 - .5 Acceptable alternate: Ezobord (similar design/shapes)

Part 3 Execution

3.1 EXAMINATION

- .1 Examine carefully surfaces to which panels will be attached and report defects to the Architect. Commencement of installation will signify complete acceptance of substrate.

3.2 INSTALLATION OF TECTUM PANELS

1. Fasten metal furring channels to wall at 600 mm O.C. and at perimeter to receive panels, insulation and wood trim. Refer to detail drawings.
2. Install acoustic insulation to suitable friction fit between channels.
3. Fasten Tectum panels, long dimension to the vertical, to furring using suitable self tapping screws at maximum 300 mm O.C.

4. Install wood surround trim. Refer to Section 06 40 00.

3.3 INSTALLATION OF PANELS

1. Fasten zee clips to wall-shim, as required, for level and even appearance.
2. Install insulated panels on clips. Provide vandal resistant fastening and metal trim.

3.4 CLEANING

- .1 Keep acoustic installation and all components clean. Remove blemishes immediately.

3.5 PROTECTION

- .1 Use cardboard to protect finished acoustical wall treatment from damage.
- .2 Remove prior to substantial completion.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 05 50 00 – Metal Fabrications.
- .3 Section 08 11 14 – Metal Doors and Frames.
- .4 Section 09 91 27 – Finish and Colour Notes.
- .5 Section 09 91 30 – Door and Room Finish Schedule.

1.2 REFERENCES

- .1 Architectural Painting Specifications Manual, Master Painters Institute (MPI).
- .2 Ontario Painting Contractors Association (OPCA) Architectural Specification Manual - referenced as OPCA Manual, latest Edition. Paint formulations and methods referred to herein refer to this Manual. If contractor is unfamiliar with this reference standard, contact the OPCA at (416) 498-1897.

1.3 WARRANTY

- .1 At outset of the contract, contractor to register with the OPCA for the inspection service paid for from Cash Allowances.
- .2 Upon completion of the inspection program, contractor to furnish an OPCA 2 Year Guarantee. The Guarantee shall warrant that the work has been performed with respect to the standards and requirements incorporated in the OPCA specification manual-latest edition.

1.4 ENVIRONMENTAL PERFORMANCE REQUIREMENTS

- .1 Do not apply paint finish in areas where dust is being generated.
- .2 Conform to requirements of OPCA Manual.
- .3 Comply with the requirements of Section 01 35 30- Health and Safety.

1.5 JOB MOCK-UP

- .1 Complete a mock-up room to be reviewed and approved by Owner, Consultant, and OPCA Inspector for approval on application of block filler and finish paint coats.

1.6 SCHEDULING OF WORK

- .1 Submit work schedule for various stages of painting to Consultant for approval. Submit schedule minimum of 72 hours in advance of proposed operations.
- .2 Obtain written authorization from Consultant for any changes in work schedule.

- .3 Schedule painting operations to prevent disruption of occupants in and about the building.

1.7 EXTRA MATERIALS

- .1 Submit one - four litre can of each type and colour of [primer] [stain] [finish coating]. Identify colour and paint type in relation to established colour schedule and finish system.
- .2 Deliver to Contractor and store where directed.

1.8 DELIVERY, HANDLING AND STORAGE

- .1 Labels shall clearly indicate:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .2 Remove damaged, opened and rejected materials from site.
- .3 Provide and maintain dry, temperature controlled, secure storage.
- .4 Observe manufacturer's recommendations for storage and handling.
- .5 Store materials and supplies away from heat generating devices.
- .6 Store materials and equipment in a well ventilated area with temperature range 7°C to 30°C.
- .7 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .8 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Consultant. After completion of operations, return areas to clean condition to approval of Consultant.
- .9 Remove paint materials from storage only in quantities required for same day use.
- .10 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .11 Fire Safety Requirements:
 - .1 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
 - .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.9 FINISHES AND COLOURS

- .1 Review the requirements outlined in Section 099127, Finish Schedule and Colour Notes. A separate colour schedule will be issued after contract award.

- .2 Allow for 10 colours total from all formulations for this project including room wall accent colours.

1.10 WASTE MANAGEMENT AND DISPOSAL

- .1 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
- .2 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .3 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
- .4 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground the following procedures shall be strictly adhered to:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
 - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
 - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - .4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
 - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
- .5 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
- .6 Set aside and protect surplus and uncontaminated finish materials: galvanized touch up; wood stain, prefinished metal touch up paint. Deliver to or arrange collection by recycling organization for verifiable re-use or re-manufacturing.
- .7 Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

Part 2 Products

2.1 MATERIALS

- .1 Acceptable Manufacturer's: Where OPCA code numbers are not referenced, use Products from one of the following manufacturers:
 - .1 Benjamin Moore & Co. Ltd.
 - .2 Canadian Industries Ltd.
 - .3 ICI (Glidden) Paints.
 - .4 Para Paints.
 - .5 Pratt & Lambert Inc.

- .6 SICO Coatings.
- .7 The Sherwin-Williams Company.

- .2 Manufacturers of intumescent coatings having Product considered acceptable for use:
 - .1 A/D Fire Protection Systems Inc.
 - .2 Carboline.
- .3 Paint materials for paint systems shall be products of a single manufacturer.
- .4 Acceptable products: Per Chapter 5 OPCA Manual and as listed.
- .5 Paint materials for each paint system to be products of a single manufacturer.
- .6 Use low-VOC and low-odour paints only.

Part 3 Execution

3.1 GENERAL

- .1 Prepare surfaces to receive paint per Chapter 3 OPCA Manual.

3.2 APPLICATION

- .1 Sand and dust between each coat to remove defects visible from distance up to 1.5 m.
- .2 Finish closets and alcoves as specified for adjoining rooms.
- .3 Apply each coat at the proper consistency. Each coat of finish should be fully dry and hard before applying the next coat, unless the manufacturer's instructions state otherwise.
- .4 Method of application to be as approved by Consultant. Apply paint by [brush] [roller] [air sprayer] [airless sprayer]. Conform to manufacturer's application instructions unless specified otherwise.
- .5 Brush and Roller Application:
 - .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Consultant.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
- .6 Spray application:

- .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
- .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
- .3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.
- .4 Brush out immediately all runs and sags.
- .5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.
- .7 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access and only when specifically authorized by Consultant.
- .8 Apply coats of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .9 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .10 Sand and dust between coats to remove visible defects.
- .11 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .12 Finish inside of cupboards and cabinets as specified for outside surfaces.
- .13 Finish closets and alcoves as specified for adjoining rooms.
- .14 Finish top, bottom, edges and cut-outs of doors after fitting as specified for door surfaces.

3.3 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Refer also to Finish Notes in Section 099127- Finish and Colour Notes.
- .2 Paint exposed conduits, pipes, hangers and other mechanical and electrical equipment occurring in finished areas as well as inside cupboards and cabinet work. Colour and texture to match adjacent surfaces, except as noted otherwise. Coordinate with mechanical trades applying banding and labeling after pipes have been painted. Do not paint white PVC covers on exposed mechanical water, drain and other lines
- .3 Paint gas piping standard yellow where visible on roof or in service spaces. Do not paint gas meter or gas equipment in wall niche yellow—colour to later selection by Architect.
- .4 Paint surfaces inside of ductwork and elsewhere behind grilles where visible using primer and one coat of matte black paint.
- .5 Paint both sides and edges of plywood backboards for equipment before installation.
- .6 Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

3.4 PAINT SYSTEMS

- .1 System references listed are based on Chapters 4A and 4B of OPCA Manual and are OPCA Premium Grade, unless noted otherwise.

3.5 INTERIOR FINISHES

- .1 Wood, where applicable:
 - .1 Miscellaneous trim: INT. 1-A, Alkyd Semi-Gloss Finish, Premium Grade
 - .2 Casework and miscellaneous wood items:
 - .1 Exterior surfaces: INT. 1-A, Alkyd Semi-Gloss Finish, Premium Grade
 - .2 Interior surfaces: INT. 1-A, Alkyd Semi-Gloss Finish, Premium Grade
 - .3 Wood Benches and Upper Shelves: INT. 2-F, Stained Alkyd Satin Finish, Premium Grade.
 - .4 Gym Storage Shelves: INT. 3-A, Stain Finish, Custom Grade
- .2 Gypsum board: INT.4-B, Latex Eggshell Finish, Premium Grade.
- .3 Acoustical wall panels: INT. 6-A, Latex Flat Finish, Custom Grade.
- .4 Concrete Block: EP - All corridors, stairwells and vestibules - 100 percent zero VOC two- part epoxy.
- .5 Concrete Block: INT.8-C -modified; Areas other than corridors, stairwell and vestibules - Latex Semi-Gloss Finish, Premium Grade. Modified system refers to all work where 2 full coats of block filler shall be applied.
- .6 Concrete Floors; refer to Section 03 35 05 Concrete Floor Hardeners
- .7 Miscellaneous metal:
 - .1 Primed: INT. 12-A, Alkyd Semi-Gloss Finish, Premium Grade
 - .2 Galvanized: INT. 13-A, Alkyd Semi-Gloss Finish, Premium Grade
 - .3 INT. 12-G, Water based Epoxy finish, two coats on a rust inhibitive primer for all exposed steel railings, guards, etc..
- .8 Galvanized metal: INT. 13-A, Alkyd Semi-Gloss Finish, Premium Grade
- .9 Hollow Metal Doors and Frames: Without exception, all wipecoated Galvanized Hollow Metal Doors, Frames and Screens, interior and exterior shall be field cleaned with solvent, galvanized prime paint coated and then finished with INT. 13-A Premium Grade, Gloss Finish. Base coat primer shall be submitted for review in advance or door/frame painting shall be rejected by Consultant. For exterior hollow metal frames, if any, adjacent to aluminum windows, provide finish coat as an exterior premium grade metallic gloss finish to match anodized windows or Aluminum Composite panels. Colour to be confirmed by Architect during construction.
- .10 Other Painting:
 - .1 In the any rooms with exposed metal deck including mechanical rooms and storage rooms:
 - .1 Allow for single colour for deck and joists.

- .2 Allow for complete painting of all hangers and equipment brackets including but not limited to, electrical and mechanical equipment, etc.
- .3 painting deck/floor slab and structural steel is part of painting contract.

3.6 EXTERIOR PAINTING

- .1 Pavement markings: To CGSB 1-GP-74M, alkyd traffic paint.
 - .1 Sandblast existing line painting on asphalt to Owner's satisfaction, prior to application of new markings.
 - .2 Colour: to CGSB 1-GP-12C, white 513-301.
 - .3 Thinner: to CAN/CGSB-1.5
 - .4 All paint to confirm to OPSS #1712 and be supplied by one of the following suppliers.

White Paint Code	
Niagara Paint and Chemical Co. Ltd.	#87932
Ibis Products Ltd.	#40-2478
CIL	#7612-26992
Sherwin Williams	#C97WG129
Sico Paints	#3007649W
- .2 Miscellaneous metal:
 - .1 Primed: EXT. 11-A-Gloss, Premium Grade
 - .2 Galvanized: Touch up any welds, cuts or damage with 'Galvafroid' Paint by W.R. Meadows prior to prime and finish coats.; Finish System EXT. 12-A-Gloss, Premium Grade
- .3 Galvanized Structural Steel: Touch up any welds, cuts or damage with 'Galvafroid' Paint by W.R. Meadows prior to prime and finish coats.; Finish System: EXT. 12-A-Gloss, Premium Grade.
- .4 Steel - high heat: EXT. 15-A
- .5 Paint exterior vents and louvres located in masonry to match adjacent masonry in colour.

3.7 INSPECTIONS

- .1 Provide Architect with all formulations at outset of project.
- .2 Cooperate at all times with the paint inspection agency in the performance of their duties as required as part of the work of this Section.
- .3 Inspection costs to be paid from Cash Allowance.

END OF SECTION

Part 1 General

1.1 GENERAL FINISH NOTES

- .1 The Material and Colour Schedule will be issued by the Consultant after tender. It shall be read in conjunction with the Drawings, Specifications, Room Schedule and Door Schedule. Colour and material references named will be based on one manufacturer, as carried by the Contractor or, in the case that no specific manufacturer is carried, based on the Consultant's choice.
- .2 Approved alternative manufacturers will be acceptable only as indicated in the specifications. However, approved alternate products submitted must match the products named in the Specification to the Consultant's selection. Alternate products other than those named in the specifications will not be allowed unless previously approved by the Consultant.
- .3 Consult Consultant prior to painting any surface not included in the formulae as listed.
- .4 Final colour for exterior painted surfaces and prominent interior areas shall be approved on the job site by the Consultant.
- .5 Paint samples: Contractor to submit paint samples for all areas required to "Match Adjacent Finish".
- .6 All similar paint formulations are to be identical when dry. Variations in tone, texture or sheen shall not be accepted.
- .7 Submit two 300 mm x 300 mm paint samples of each colour required for approval by the Architect.
- .8 Exact locations of accent paint called for in the Material and Colour Schedule, to be issued after Contract award, not specifically identified on the drawings are to be verified on site with the Consultant.

1.2 EXTERIOR FINISH NOTES

- .1 All exposed metal (doors, frames, lintels, stairs, handrails, mechanical equipment, etc.) to be painted except for prefinished metal louvres, stainless steel, and aluminum. Mechanical equipment is to be painted whether delivered to the site pre-painted or not (exhaust fans, goosenecks, exhaust stacks, supports, HVAC units, HRU units, etc.). Colours to match adjacent material-generally either to match brick or tan to match flashing or siding material. Do not paint exposed white PVC pipe covers on interior. Architect will advise on jobsite which other items mentioned above, if any, do not require painting.
- .2 All unfinished metal work provided by landscaping is to be painted by Section 099122-Painting.

1.3 INTERIOR FINISH NOTES

- .1 All heating units, recessed convectors, grilles, pipes, access panels, hangers and miscellaneous exposed metal work (except stainless steel or anodized aluminum) to be painted to match the surfaces on which they occur unless noted otherwise on the colour schedule, prefinished in suitable colour or directed by the Consultant. If prefinished equipment is damaged, it shall be re-painted. Painting to be by formulations specified in Section 09 91 12- Painting.
- .2 All interior fitments, casework, millwork, etc. to be melamine unless otherwise noted. Refer to Sections for specific requirements regarding materials, construction, finishes and hardware. Note that drawer and cupboard interiors are to be considered as exposed surfaces and will therefore be finished.
- .3 Do not paint over nameplates, identification tags, etc.
- .4 Make good all existing surfaces and finishes that are damaged during construction.

END OF SECTION

PART 1 - GENERAL

1.1 General Notes

1. Find the **Room Finish Schedule** on the following page.
2. Refer to interior elevations, plans sections and reflected ceiling plans to coordinate finish notes and extents of materials.
3. Refer to various specifications sections for different types of materials including, but not limited to:
 - .1 flooring materials such as resilient tile
 - .2 ceiling materials such as Lay-In Acoustical panel (LAP)
 - .3 Acoustical wall treatment
4. Abbreviations Legend:

<u>Code</u>	<u>Reference</u>
ASD	Acoustic Steel Deck
ASF	Acoustic Sheet Flooring
CMT	Ceramic Mosaic Tile
CPT	Carpet Tile
CWT	Ceramic Wall Tile
CB	Concrete Block
GWB	Gypsum Board
LAP	Lay-in Acoustic Panel
LVT	Luxury Vinyl Tile
EP	Epoxy Paint
EX	Existing
EXIST	Existing
POR	Porcelain Tile
PT	Paint
RE/RE	Remove existing and replace with new
RR	Resilient Rubber
RSTR	Rubber Stair Tread & Riser
RSF	Rubber Sheet Flooring
RT	Rubber Tile
SF	Resilient Sheet Flooring
S.CONC	Sealed Concrete (refer to Section 03 35 05)
TERR	Terazzo (patch as required to match existing)
VCT	Vinyl Composite Tile
WRGB	Water-Resistant Gypsum Board

END OF SECTION

**Renovation To Ascension Catholic Elementary School
Room Finish Schedule**

ROOM FINISH SCHEDULE		FLOOR		WALL		CEILING			REMARKS
NO.	NAME	FIN.	BASE	MAT'L	FIN.	MAT'L	FIN.	HEIGHT(mm)	
GROUND FLOOR									
x100	STAIR A	RT/RSTR	RR	-	-	-	-	-	RSTR & RT ON STAIR TREADS AND LANDINGS WITH TACTILE RUBBER TILES AT TOP LANDING PER OBC
x101	CLASSROOM	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x102	CLASSROOM	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x103	CLASSROOM	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x104	CLASSROOM	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x105	KINDERGARTEN	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x106	KINDERGARTEN	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x107	COMPUTER LAB	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x107A	STORAGE	-	-	-	-	EXP.	-	-	EXISTING TO REMAIN
x107B	STAIR C	RT/RSTR	RR	-	-	EXP.	-	-	RSTR & RT ON STAIR TREADS AND LANDINGS WITH TACTILE RUBBER TILES AT TOP LANDING PER OBC
x107C	STAIR B	RT/RSTR	RR	-	-	EXP.	-	-	RSTR & RT ON STAIR TREADS AND LANDINGS WITH TACTILE RUBBER TILES AT TOP LANDING PER OBC
x108	CLASSROOM	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x109	HEALTH ROOM	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x110	PRINCIPAL	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.

**Renovation To Ascension Catholic Elementary School
Room Finish Schedule**

ROOM FINISH SCHEDULE		FLOOR		WALL		CEILING			REMARKS
NO.	NAME	FIN.	BASE	MAT'L	FIN.	MAT'L	FIN.	HEIGHT(mm)	
x110 A	SEMINAR	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x111	UTR	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x112	CYC ROOM	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x113	SPECIAL ED	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x113 A	CALMING	-	-	-	-	EXP.	-	-	EXISTING TO REMAIN
x114	GENERAL OFFICE	-	-	-	-	LAP	-	2800	NEW CEILING
x115	ACADEMIC STORAGE	-	-	-	-	EXP.	-	-	EXISTING TO REMAIN
x115 A	SPRINKLER	-	-	-	-	EXP.	-	-	EXISTING TO REMAIN
x116	GIRLS CHANGEROOM	-	-	-	-	EXP.	-	-	EXISTING TO REMAIN
x117	BOYS CHANGEROOM	-	-	-	-	EXP.	-	-	EXISTING TO REMAIN
x118	CUSTODIAN	-	-	-	-	EXP.	-	-	EXISTING TO REMAIN
x119	MUD ROOM	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x120	FOYER	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x121	MUD ROOM	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x122	STORAGE	-	-	-	-	EXP.	-	-	EXISTING TO REMAIN
x123	BF WR	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x124	BF WR	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.

ROOM FINISH SCHEDULE		FLOOR		WALL		CEILING			REMARKS
NO.	NAME	FIN.	BASE	MAT'L	FIN.	MAT'L	FIN.	HEIGHT(mm)	
x125									
x126	ELEV.	-	-	-	-	EXP.	-	-	EXISTING TO REMAIN
x127	CORRIDOR	-	-	EX.CB	P	EX. LAP	-	EXIST.	REMOVE WALL MURAL(S), PATCH & MAKE GOOD WALLS. PRIME AND PAINT TO MATCH EXISTING WALL COLOUR. RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x128	BOILER ROOM	-	-	-	-	EXP.	-	-	EXISTING TO REMAIN
x129	BOYS WASHROOM	POR	POR	EX. CB	CWT	GYP	-	-	
x130	GIRLS WASHROOM	POR	POR	EX. CB	CWT	GYP	-	-	
x131	WORKROOM	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x131 A	AV ROOM	-	-	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x132	LIBRARY	-	-	EX.CB	P	EX. LAP	-	EXIST.	REMOVE WALL MURAL(S), PATCH & MAKE GOOD WALLS. PRIME AND PAINT TO MATCH EXISTING WALL COLOUR. RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x133	STAGE	-	-	-	-	EXP.	-	-	EXISTING TO REMAIN
x134	INDOOR STORAGE	-	-	-	-	EXP.	-	-	EXISTING TO REMAIN
x135	ELEV. MECH.	-	-	-	-	EXP.	-	-	EXISTING TO REMAIN
x136	FORUM	POR	POR	EX.CB	P	LAP	-	2600	REMOVE WALL MURAL(S), PATCH & MAKE GOOD WALLS. PRIME AND PAINT TO MATCH EXISTING WALL COLOUR. NEW CEILING TILES FOR NEW ELEC. NEW FLOORING AND PATCH FOR NEW PAINT.
x137	GYMNASIUM	-	-	EX.CB	P	EXP.	P	-	ALL WALLS AND CEILING TO BE PAINTED, INCLUDING ALL PIPES, CONDUIT AND DUCTS. CLEAN AND PROTECT GYM EQUIPMENT, FANS AND LIGHTING FROM PAINT. LOGO TO REMAIN AND EDGES TO BE TOUCHED UP AS REQUIRED.
x138	SIDE ENTRANCE	TERR	TERR	-	-	EXP.	-	-	REPLACE TERRAZO FLOORING AS REQUIRED FOR INSTALATION OF NEW HM DOOR.

ROOM FINISH SCHEDULE		FLOOR		WALL		CEILING			REMARKS
NO.	NAME	FIN.	BASE	MAT'L	FIN.	MAT'L	FIN.	HEIGHT(mm)	
SECOND FLOOR									
x200	STAIR A	RT/RSTR	RR	-	-	LAP	-	2300	RSTR & RT ON STAIR TREADS AND LANDINGS WITH TACTILE RUBBER TILES AT TOP LANDING PER OBC. NEW FLOATING LAP CEILING AND TRIM
x201	CLASSROOM	SF	RR	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x202	CLASSROOM	SF	RR	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x203	CLASSROOM	SF	RR	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x204	CLASSROOM	SF	RR	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x205	CLASSROOM	SF	RR	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x206	CLASSROOM	SF	RR	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x206 A	CALMING ROOM	SF	RR	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x207	SCIENCE CLASSROOM	SF	RR	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x208	ART CLASSROOM	SF	RR	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x208 A	ART STORAGE	SF	RR	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x208 B	WORKROOM	SF	RR	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x209	CLASSROOM	SF	RR	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x210	CLASSROOM	SF	RR	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.

**Renovation To Ascension Catholic Elementary School
Room Finish Schedule**

ROOM FINISH SCHEDULE		FLOOR		WALL		CEILING			REMARKS
NO.	NAME	FIN.	BASE	MAT'L	FIN.	MAT'L	FIN.	HEIGHT(mm)	
x211	STAIR C	RT/RSTR	RR	-	-	-	-	-	RSTR & RT ON STAIR TREADS AND LANDINGS WITH TACTILE RUBBER TILES AT TOP LANDING PER OBC
x212	CORRIDOR	-	-	-	-	EX. LAP	-	-	EXISTING TO REMAIN
x212 B	CUSTODIAL	-	-	-	-	EX. LAP	-	-	EXISTING TO REMAIN
x212 C	SENSORY	SF	RR	-	-	EX. LAP	-	-	EXISTING TO REMAIN
x213	STAIR B	RT/RSTR	RR	-	-	-	-	-	RSTR & RT ON STAIR TREADS AND LANDINGS WITH TACTILE RUBBER TILES AT TOP LANDING PER OBC
x214	MECH ROOM	-	-	-	-	EXP.	-	-	EXISTING TO REMAIN
x215	BOYS WASHROOM	POR	POR	EX. CB	CWT	GYP	-	2800	
x216	GIRLS WASHROOM	POR	POR	EX. CB	CWT	GYP	-	2800	
x217	STAFF LOUNGE	SF	RR	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x217 A	WORKROOM	SF	RR	-	-	EXP.	-	-	
x218	FOYER	POR	POR	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x218 B	STAFF WR	POR	POR	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.
x218 C	STAFF WR	POR	POR	-	-	EX. LAP	-	EXIST.	RE/RE CEILING TILES AS REQUIRED FOR NEW ELEC.

GENERAL NOTES:ALL EXISTING FLOORING AND WALL TILE TO BE REMOVED IN AREAS OF RENOVATION.

1	REFER TO SPECIFICATION SECTION 09 91 30 FOR ABBREVIATIONS LEGEND
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Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 05 50 00 - Metal Fabrications: Suspended channel support for ceiling hung partitions.
- .3 Section 10 28 10 - Toilet And Bath Accessories.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A167-[99], Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-71.20-[M88], Adhesive, Contact, Brushable.
- .3 Canadian Standards Association (CSA)
 - .1 CAN/CSA-B651-[95(R2001)], Barrier-Free Design.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate fabrication details, plans, elevations, hardware, and installation details.

1.4 SAMPLES

- .1 Submit samples of finish hardware and phenolic plastic in selected colour and finish in accordance with Section 01 33 00 - Submittal Procedures, for approval of Consultant.

1.5 STORAGE AND PROTECTION

- .1 Protect finished laminated plastic surfaces during shipment and installation. Do not remove until immediately prior to final inspection.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal [paper] [plastic] [polystyrene] [corrugated cardboard] packaging material [in appropriate on-site bins] for recycling.
- .3 Place materials defined as hazardous or toxic in designated containers.

- .4 Divert unused metal materials from landfill to metal recycling facility as approved by Consultant.
- .5 Unused sealant and adhesive material must be disposed of at an official hazardous material collections site as approved by Consultant.
- .6 Fold up metal banding, flatten and place in designated area for recycling.
- .7 Do not dispose of unused sealant and adhesive material into sewer system, into streams, lakes, onto ground or in any other location where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

- .1 Doors, Panels and Pilasters:
 - .1 Phenolic or high density polyethylene (HDPE) fabricated from polymer resins compounded under high pressure, forming single thickness panel.
 - .2 Waterproof and non-absorbent, with self-lubricating surface, resistant to marks by pens, pencils, markers, and other writing instruments.
 - .3 Thickness: 1 inch (25 mm) with 1/4 inch (6 mm) radiused edges. One edge of pilaster and transom panels to be ship lapped.
 - .4 Panel above door must be translucent (frosted) resin or acrylic type material, to allow emergency strobe light transmission through into washroom stall. Manufacturer must be able to provide this translucent panel.
 - .5 Fire Rating: Tested in accordance too NFPA 286: Pass.
 - .6 Fire Rating: Tested to meet ASTM E 84: Class B flame spread/smoke developed rating.
 - .7 Standard Collection, Does not meet NFPA 286 or ASTM E84.
 - .8 Aluminum and Aluminum Extrusions: ASTM B221, 6463-T5 alloy and temper.
 - .9 Stainless Steel: ASTM A167, Type 304.

2.2 TOILET COMPARTMENT SYSTEM

- .1 Basis of Design: ARIA Toilet Partitions as manufactured by and supplied by Scranton Products.
 - .1 Style: **Increased privacy** floor mounted overhead braced toilet compartments (privacy at floor, open at top).
 - .2 Sightline-free, gap-free interlocking doors and stiles design.
 - .3 Acceptable products: ARIA by Scranton Products, BRIO Series by EAD Design and EURO - Highrise by Bradley.
- .2 System Construction:
 - .1 System Specified Height: Full height floor to ceiling (no gaps) as confirmed on site.
 - .2 Doors: Full height floor to ceiling, mounted 1/2 inch (13 mm) maximum above finished floor (to accommodate slopes in floor only) at doors only. All other panels to extend to floor with no gaps, and open at ceiling.

- .3 Dividing Panels: Two panels stacked and secured with 3 dowels ensuring proper alignment totaling the system specified height
 - .1 Trim: Application to hide seam gap between dividing panels.
 - .4 Pilasters: System specified height, shoeless system secured with 3/4 inch (19 mm) long stainless steel tamper resistant Torx head screws and angled wall brackets.
 - .5 Transom Panel: Height required to accommodate specified system height with ship lap on one edge. Mounted with four mending plates using 3/4 inch (19 mm) long stainless steel tamper resistant Torx head screws.
 - .6 Wall Brackets: 54 inches (1372 mm) long, heavy-duty aluminum with bright dip anodized finish. Mounts to pilasters, panels and walls with 3/4 inch (19 mm) long stainless steel tamper resistant Torx head screws.
- .3 System Design:
- .1 Door Design: Traditional Series; Model 1000 standard flat panel door, side panels and pilasters.
 - .2 Door Design: As determined by the Architect from Manufacturer's selection.
 - .3 Side Panel Design: Plain (standard).
 - .4 Color: As determined by the Architect from Manufacturer's selection.
 - .5 Trim: As determined by the Architect from Manufacturer's selection.
 - .6 Trim Color: As determined by the Architect from Manufacturer's selection.

2.3

HARDWARE:

- .1 Hinges: Helix style 78 inches (1981 mm) edge mounted continuous hinge.
 - .1 Stainless steel: 0.074 inch (1.88 mm) thick 304-2B stainless steel using a stainless-steel pin in 0.234 inch (5.94 mm) diameter.
 - .2 Closing degree is minus 5 degrees. Hinge is designed to come to a full close on its own weight.
- .2 Occupancy Indicator Latch and Housing: Satin stainless-steel showing green and red occupancy indicators.
 - .1 Latch housing: Satin stainless steel.
 - .2 Slide bolt and button: Satin stainless steel.
 - .3 Door Pulls: Satin stainless steel.
- .3 Coat Hook and Bumper:
 - .1 Combination type, chrome plated Zamak.
 - .2 Equip outswing handicapped doors with second door pull and door stop.
- .4 Hardware:
 - .1 Stainless steel surface-mounted slide latch and keeper.
 - .2 Continuous stainless steel spring-loaded hinge.
 - .3 Continuous stainless steel brackets.
 - .4 Door pull: Barrier-free type suited for out-swinging doors stainless steel.

2.4 MATERIAL DESCRIPTION

- .1 1.6 mm high pressure laminate facings and edging on phenolic core, and complete with stainless steel hardware and fittings.
- .2 Doors, pilasters and partitions to be min, 25 mm thick.
- .3 headrails to be 24 x 41 anodized aluminum anti-grip type with sloped top configured and installed to prevent swinging or concealment of small items.
- .4 pilasters to have 3.2 mm core and integral leveling device concealed by 100 mm high stainless steel shoe.
- .5 all doors to have rubber tipped bumper and slide bar latch, combination door stop and keeper, all attached with stainless steel sleeve bolts with theft proof heads.
- .6 coat hooks to be provided as noted above.
- .7 provide stops on top and bottom of all doors
- .8 All partitions to be anchored to wall by means of stainless steel channel bracket for full height of partition.

Acceptable Materials: as manufactured by Scranton Products and other companies providing full height partitions meeting or exceeding these exact specifications if reviewed and approved by the Consultant during the tender period.

2.5 CHILDCARE TOILET SCREENS

- .1 Provide urinal style screens between childcare toilets, to be approx. 6" above floor to 6'-0" min in height.
 - .1 Acceptable products: ARIA by Scranton Products, BRIO Series by EAD Design and EURO - Highrise by Bradley.

2.6 COMPONENTS

- .1 Safety Release Coat Hook (SCH):
 - 2 High strength polycarbonate coat hook with safety release weight under downward pressure to not exceed 12 kg (26 lbs.)
 - .3 Supply all suitable mounting hardware for a vandal proof, secure installation using stainless steel sleeve bolts on partition doors or panels. Do not supply standard Robertson or Phillips head screws.
 - .4 Colours: white
 - .5 Acceptable Materials: "Model 1150 – Safety Coat Hook" with stainless steel base as manufactured/distributed by Frost.
 - .6 Locations: Refer to drawings for locations.
 - .1 Samples: submit test data and samples for review as specified in Section 013330 – Submittal Procedures.

2.7 FABRICATION

- .1 Fabricate pilasters and stiles minimum 25 mm thick, and panels and doors minimum 25 mm thick, of materials as specified.
- .2 Supply steel floor inserts and locations to Contractor for placing prior pouring of floor slab.

- .3 Provide pilasters with 2.9 mm, stainless steel leveling bar, rod and anchor concealed by one-piece 102 mm high stainless steel.
- .4 Include panel brackets, hinges, door stops, latches, safety release coat hooks for metal partitions, fastening devices, bumpers, and pull on the outside of doors to handicapped accessible compartments.
- .5 Coat hooks to be mounted in ALL washroom toilet stalls and shall be safety release style and mounted on the side wall or to consultant direction.

Part 3 Execution

3.1 INSTALLATION

- .1 Install compartments in accordance with reviewed shop drawings and in a neat, rigid manner free of defects.
- .2 Provide anchors, inserts and fixings necessary for attachment of supports. Supply steel floor inserts and locations to Contractor for placing prior pouring of floor slab. Elsewhere, drill supports as required to receive attachment of compartments.
- .3 Install units secure, accurately positioned, plumb, level, square and free from sag and distortion. Provide 3 brackets per partition.
- .4 Perform drilling of steel, masonry and concrete necessary to install this work.
- .5 Ensure spaces between panels and pilasters, between panels and walls and between pilasters and walls are of uniform consistent width and sized to ensure it is not possible to see persons using the compartments.
- .6 Coordinate installation with the work of trades providing ceilings, wall and floor finishes, shower accessories and other adjacent components and construction.
- .7 Use stainless steel anchors and fasteners; ferrous metals are not acceptable.
- .8 Provide for adjustment of ceiling variations with screw jack through steel saddles made integral with pilaster. Conceal fixings with stainless steel shoes.
- .9 Do work in accordance with CAN/CSA-B651.

3.2 ADJUSTMENT

- .1 Upon completion of the work or when directed, remove all traces of protective coating or paper.
- .2 Clean exposed surfaces and fittings.
- .3 Test safety release Coat Hooks, hinges, locks and latches and where necessary, adjust and lubricate. Set hinges so that doors stand open maximum 30 degrees when compartment is not in use. Ensure that partitions are in working order.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 10 21 14 – Metal Toilet Compartments.
- .3 Section 10 28 10 – Plastic Toilet Compartments.
- .4 Section 08 80 50 – Glazing: Mirrors.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A167-[99], Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM B456-[95], Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
 - .3 ASTM A653/A653M-[99], Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .4 ASTM A924/A924M-[99], Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.81-[M90], Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
 - .2 CAN/CGSB-1.88-[92], Gloss Alkyd Enamel, Air Drying and Baking.
 - .3 CAN/CGSB-12.5-[M86], Mirrors, Silvered.
 - .4 CGSB 31-GP-107Ma-[90], Non-inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover.
- .3 Canadian Standards Association (CSA)
 - .1 CAN/CSA-B651-[95], Barrier-Free Design.
 - .2 CAN/CSA-G164-[M92], Hot Dip Galvanizing of Irregularly Shaped Articles.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures
- .2 Shop drawings of units for use by the handicapped shall be distinctly marked and cross-referenced to the corresponding article in the specifications.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

Part 2 Products

2.1 MATERIALS

- .1 Ferrous Steel: Sheet, cold-rolled furniture steel, double annealed, mill stretched and leveled, and fully pickled. Otherwise, steel shall be hot-rolled or cold-rolled of alloy to suit needs of fabrication, use, and appearance.
- .2 Galvanized Steel: For sheet, Z275 zinc coating designation in accordance with ASTM Specification A525. For irregular sections, hot dip galvanized to comply with CSA G164.
- .3 Stainless steel sheet metal: to ASTM A167, Type 304, with No. 4 finish.
- .4 Anchors and Fastenings: Where exposed, use stainless steel and otherwise to match metal anchored. Where non-exposed, use the same as that specified for exposed, or use galvanized steel. Anchors and fastenings shall be of the type appropriate for the substrate to which accessory unit is secured.

2.2 COMPONENTS

- .1 Hand Dryers – Semi-recessed (HD): refer to Electrical specifications.
- .2 Fixed Grab Bars (GB): 32 mm outside diameter; 1.2 mm thick stainless steel; pended non-slip finish; round or oval concealed flange attachments, as described below:
 - .1 Straight Profile: e.g. Frost Model 1001-DP-24.
 - .2 L-Shaped Profile: e.g. Frost Model 1003-DP-30x30.
 - .3 All bars to have concealed mounting hardware
 - .4 Quantity: refer to drawings
 - .5 All bars to withstand horizontal and vertical pull of 2.2 Kn
 - .6 Location: Washrooms, refer to contract drawings.
- .3 Sanitary Napkin Disposal (SN): Model 620, by Frost
 - .1 Quantity: refer to drawings
 - .2 Location: Washrooms, refer to drawings
- .4 Sanitary Napkin Dispenser (SND): Surface Mounted Model 618-3-FREE, by Frost
 - .1 Quantity: refer to drawings
 - .2 Location: Washrooms, refer to drawings
- .5 Safety Release Coat Hook (BH):
 - .1 Refer to drawings for locations.
 - .2 High strength polycarbonate coat hook with safety release weight under downward pressure to not exceed 12 kg (26 lbs.)
 - .3 Supply all suitable mounting hardware for a vandal proof, secure installation using stainless steel sleeve bolts on partition doors or panels. Do not supply standard Robertson or Phillips head screws.
 - .4 Colours:
 - .1 Allow for one (1) colour from Manufacturers standard line

- .5 Acceptable Materials: "Henkel Hook" as manufactured/distributed by Henkel Diversified Inc, London ON, tel (519) 641-5872.
- .6 Locations:
 - .1 Barrier-Free Washrooms
 - .2 Refer to drawings for locations
- .6 Mirrors
 - .2 Fixed Mirrors (designation Type ML):
 - .1 Best quality, 6 mm thick float glass complete with concealed, tamperproof clip fasteners
 - .2 24 ga., Type 302 or 304 No 4 finish stainless steel frames on all edges and galvanized iron backing with concealed mounts.
 - .3 Sizes: each unit 610 mm x 1520 mm.
 - .4 Locations: as shown on Drawings.
 - .5 Acceptable Materials: Bobrick Model B-290 2460; 24" x 60" each.
 - .6 Acceptable alternate: equivalent size and details by Bobrick or Twin Cee
- .7 Toilet Paper Dispenser (TD): SUPPLIED BY OWNER
 - .1 To be supplied by Owner and installed by Contractor.
 - .2 Quantity: refer to drawings
 - .3 Location: Washrooms, refer to drawings.
- .8 Soap Dispenser (SD): SUPPLIED BY OWNER
 - .1 To be supplied by Owner and installed by Contractor.
 - .1 Quantity: refer to drawings
 - .2 Location: refer to drawings.
- .9 Acceptable Alternates to those items listed above as manufactured by Bradley Corp. & Supplied by Wentworth Assoc. Ltd., Frost Products Ltd., Watrous (ASI) or Bobrick Washroom Equipment Co. and Saferail meeting or exceeding these specifications.

2.3 FABRICATION

- .1 Construction: Fabricate with materials, component sizes, metal gauges, reinforcing, anchors and fasteners of adequate strength to withstand intended use.
- .2 Where specified as frameless, provide stainless steel accessories with one-piece fronts having 90 degree formed returns at their edges and openings.
- .3 Where accessory fronts are framed, frame edges, both inside and outside, with 90 degree formed returns continuously welded and ground smooth at the corners. Doors shall also have 90 degree formed returns as specified.
- .4 Unless otherwise specified, hinges shall be semi-concealed stainless steel piano hinges extending full-length of hinged element. Provide hinged elements with concealed, mechanically-retained rubber bumpers for silent closing, and shall close flush with faces of fronts or frames.
- .5 Ensure that work will remain free of warping, buckling, opening of joints and seams, distortion and permanent deformation.

- .6 No exposed fixings permitted. Cut edges and openings square and smooth. Chamfer corners of edges and cut-outs 1.6 mm.
- .7 Assembly: Accurately cut, machine and fit joints, corners, copes and mitres so that junctions between components fit together tightly and in true planes.
- .8 Fasten work with concealed methods, unless otherwise indicated on Drawings.
- .9 Weld all connections where possible, bolt where not possible and cut off bolts flush with nuts. Countersunk bolt heads, and provide method to prevent loosening of nuts. Ream holes drilled for fastening.
- .10 Welded joints shall be tight, flush, and in true planes with base metals. Make welds continuous at joints where entry of water into voids of members or assemblies is possible.
- .11 Provide for differential movements within assemblies and at junctions of assemblies with surrounding work.
- .12 Welds in exposed locations shall be ground and polished smooth.
- .13 Finish Work: Provide holes and connections for related work installed under other Sections of this specification, if applicable.
- .14 Cleanly and smoothly finish exposed edges of materials, including holes.

Part 3 Execution

3.1 INSPECTION OF SECTION

- .1 Take site measurements to ensure that work is fabricated to fit surrounding construction around obstructions and projects in place, or as shown on drawings, and to suit service locations.

3.2 INSTALLATION

- .1 Install all accessories in accordance with manufacturers' instructions at their recommended mounting heights unless noted otherwise on drawings.
- .2 Securely fasten accessories plumb, true, square, straight, level, and accurately and tightly fitted together and to surrounding work. Install in locations shown and specified herein. Mounting heights as shown or in accordance with the OBC in the case of barrier-free accessories.
- .3 Work shall include anchor bolts, bolts, washers and nuts, lag screws, expansion shields, toggles, straps, sleeve brackets, clips, and other items necessary for secure installation, as required by loading and by Jurisdictional Authorities.
- .4 Attach work at wood by screws through countersunk holes in metal.
- .5 Attach work to masonry with lead plugs and non-corrosive fastenings, to support load with a safety factor of 3. Perform all drilling necessary to install the work.

- .6 Insulate between dissimilar metals or between metals and masonry or concrete with bituminous paint, to prevent electrolysis.
- .7 Coordinate installation with the work of other trades adjacent to accessories to achieve the reveals or other edge conditions shown, where their front faces are flush with the finished wall surfaces.
- .8 Owner to supply and install remainder of washroom accessories not specified here (toilet paper dispensers, etc.). Cooperate with Owner as required.

3.3 CLEANING UP AND ADJUSTMENT

- .1 Upon completion of the work, or when directed, remove all traces of protective coatings or paper.
- .2 Test mechanisms, hinges, locks and latches, and where necessary, adjust and lubricate and ensure that accessories are in perfect working order.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.

1.2 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Samples:
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site packaging materials at appropriate recycling facilities.
- .2 Dispose of recyclable packaging material in appropriate on-site bin for recycling.

Part 2 Products

2.1 MATERIALS

- .1 Metal Lockers:
 - .1 Single Tier (to replace existing lockers): 380 wide x 305 deep x approx. 1828 high (confirm all dimensions on site – to replace existing lockers between existing base and overhead bulkhead).
 - .2 Fabricate from cold rolled steel, with plastic bottom shelf (floor), min. Unless noted; lockers will mount on existing 100 mm concrete base. Location: throughout school in corridors.
 - .3 Lockers must be fabricated with the following attributes:
 - 1. Minimum 16 Gauge Doors
 - 2. 16 Gauge Interior Shelves
 - 3. Minimum 18 Gauge Slope/Fillers/End Panels
 - 4. Minimum 24 Gauge Sides/Backs
 - 5. Solid Plastic Bottom Shelves
 - 6. ASTM D3363 - Ultra Anti-Graffiti Coating Paint with 4H Rating
 - .4 Locker Count: refer to drawings for quantity of lockers required
 - .5 Continuous piano hinge, recessed extruded aluminum lock pocket, metal hasp with no moving part for padlock, individual number plate,

- .6 Inside Equipment: 2 metal shelves (one near top and one near mid height), 2 hooks (one on side wall near top and one on side wall at underside of mid height shelf.)
- .7 Sloping Tops: pre-finished steel; c/w clips and other attachment devices.
- .8 Shelves shall have rolled fronts and rear flanges. Provide 25 mm air space between shelf and back of locker for ventilation. Install shelves at height to be determined by Architect at shop drawing stage.
- .9 Colours: Allow for 3 colours: single standard colour for the frame with contrasting doors in two standard colours to later selection by Architect.
- .10 Lockers to be installed on a 100 mm concrete base, unless otherwise noted.
- .11 Acceptable products: providing they meet or exceed all details of this specification as provided by:
 - .1 ASI Group Canada Inc.
 - .2 Canadian Washroom Products
 - .3 G.R.B. Storage Systems Inc.
 - .4 William Knell and Company Ltd.
 - .5 Hadrian Manufacturing Inc.
 - .6 Global Storage Systems

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 INSTALLATION

- .1 Install where indicated on drawings and as per manufacturer's instructions.

3.3 DEMONSTRATION AND TRAINING

- .1 Provide demonstration of operation to the Owner and his representatives.
- .2 Provide training for operation, maintenance and repairs.

3.4 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean surfaces after installation using manufacturer's recommended cleaning procedures.
- .3 Clean aluminum with damp rag and approved non-abrasive cleaner.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Division 26 Common Requirements for Electrical

26 00 11	Electrical Specification Contents
	Common Contract Requirements for Electrical
26 01 13	Electrical Supplemental Tender Form
26 01 15	Allowances and Fees
26 01 16	Electrical General Requirements
26 01 17	Demolition and Renovation
	Common Work Results for Electrical
26 05 19	Wires and Cables
26 05 20	Junction, and Pull Boxes
26 05 21	Outlet Boxes, Conduit Boxes and Fittings
26 05 22	Wire and Box Connectors – 0 –1000 V
26 05 33	Conduits, Conduit Fastenings and Conduit Fittings
	Panelboards
26 24 17	Moulded Case Circuit Breakers
	Low-Voltage Distribution Equipment
26 27 26	Wiring Devices
	Low-Voltage Circuit Protective Devices
26 28 16	Disconnect Switches
	Interior Lighting
26 51 13	Lighting Equipment
26 51 16	Digital Occupancy & Daylight Control Systems
28 13 10	Existing Fire Alarm System (Edwards)

END OF SECTION

Part 1 General

1.1 INSTRUCTIONS TO BIDDERS

- .1 The Electrical Supplemental Tender Form must be submitted to the architect within 2 hours of tender closing. Electrical contractors shall identify all sub-contractors he/she intends to use and must complete all information requested. The requisite information shall be given at the office of the Consultant. Contractor shall sign and date this page and initial and date each page thereafter.
- .2 Should the Electrical Supplemental Form not be submitted then the contractor shall use Basis of Design manufacturers as listed.
- .3 CONTRACTOR
I/We certify that I/We have the authority to bind the company.

_____	_____
COMPANY NAME	AUTHORIZED SIGNATURE
_____	_____
ADDRESS	PRINTED SIGNATURE
_____	_____
CITY	TITLE
_____	_____
TELEPHONE NUMBER	DATE

FAX	

CONTRACTOR'S NAME: _____ DATE: _____

- .4 The Stipulated Bid Sum shall be for the basis of design manufacturer or supplier equipment only, unless otherwise indicated. Where a choice of this equipment is given, this Contractor shall indicate the supplier or manufacturer he intends to use. Where no choice is indicated, the basis of design supplier or equipment shall be used.
- .5 Equipment or materials manufactured by firms named in the following listing only shall be deemed equal to the equipment or material specified, provided the equipment or material will have capacity, performance, rating, construction, physical dimensions, accessories and features which, in the opinion of the Consultant, are equal to those of the specified equipment or material. The Electrical Contractor shall not indicate equipment, materials or suppliers which are not listed.
- .6 Where modifications to the work of other trades are required as a result or part of the alternative offered, include the cost of said modifications in the work.
- .7 Submit the following list of basis of design and alternative suppliers in accordance with the bid requirements:

Spec. Reference Section	Equipment	Basis of Design	Acceptable Alternate Manufacturer	Indicate Manufacturer Or Supplier
26 05 75	Lighting Controls	Acuity Controls only	No Alternates	
26 24 17	Molded Case Circuit Breakers	Cutler Hammer	Siemens Schneider Electric GE Industrial	
26 28 16	Disconnect Switches	Cutler Hammer	Siemens Schneider Electric GE Industrial	
26 51 13	LED	Cooper	Lithonia Signify	
26 51 13	Exit Lighting	Stanpro	Emergilite Lumacell Ready Lite Dualite Aimlite	
26 51 13	Emergency Fixtures	Stanpro	Emergilite Lumacell o Ready Lite Dualite Aimlite	

CONTRACTOR'S NAME: _____ DATE: _____

.8 LABOUR RATES

.1 The following labour rates shall apply for calculating the cost of credit or extras on Change Notices. The rates shall include any employee benefits. The labour rates do not include overhead and profit.

Apprentice Electrician \$_____/hr

Journeymen Electrician \$_____/hr

1.2 ELECTRICAL TENDER PRICE (EXCLUDING HST)

.1 Having carefully examined all Drawings and Specifications and the Addenda to the Drawings and Specifications, and having carefully examined the sites and all conditions affecting the work, we, the undersigned thereby offer to provide all plant, labour, materials and incidentals required to complete the work of all trades for: All the work specified for herein for

the Total Stipulated Price of: \$_____

(in writing)

in lawful money of Canada; included in which are all applicable excise taxes, custom duties, freight, exchange, and all other charges. HST is not included.

END OF SECTION

CONTRACTOR'S NAME: _____ DATE: _____

Part 1 General

1.1 GENERAL INSTRUCTIONS

- .1 Comply with the General Conditions, Supplementary Conditions, and all of General Requirements, Mechanical and Electrical Divisions.

1.2 FEES

- .1 The contractor is to determine general inspection fees with Electrical Safety Authority and include as part of tender.
- .2 A Cash Allowance of \$40,000 shall be carried for the lighting controls of the project.

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 This Section covers items common to Electrical Divisions.**
- .2 This section supplements requirements of Division 1.
- .3 Furnish labour, materials, and equipment necessary for completion of work as described in contract documents.

1.2 INTENT

- .1 Mention herein or indication on Drawings of articles, materials, operations, or methods requires: supply of each item mentioned or indicated, of quality, or subject to qualifications noted; installation according to conditions stated: and, performance of each operation prescribed with furnishing of necessary labour, equipment, and incidentals for electrical work.
- .2 Where used, words "Section" and "Division" shall also include other Subcontractors engaged on site to perform work to make building and site complete in all respects.
- .3 Where used, word "supply" shall mean furnishing to site in location required or directed complete with accessory parts.
- .4 Where used, word "install" shall mean secured in place and connected up for operation as noted or directed.
- .5 Where used, word "provide" shall mean supply and install as each is described above.

1.3 TENDERS

- .1 Complete Supplemental Tender Form including list of equipment and materials to be used on this project and forming part of tender documents.
- .2 Submit Supplemental Tender Form as noted.
- .3 Submit tender based on specified described equipment or Alternates listed.
- .4 State in Tender, names of all Subcontractors proposed for work under this Division.

1.4 LIABILITY INSURANCE

- .1 This contractor must maintain and produce at the request of the consultant proof of proper insurance to fully protect the Owner, the Consultant and the Contractor from any and all claims due to accidents, misfortunes, acts of God, etc.

1.5 DRAWINGS

- .1 Electrical Drawings do not show structural and related details. Take information involving accurate measurement of building from building drawings, or at building. Make, without additional charge, any necessary changes or additions to runs of conduits and ducts to accommodate structural conditions. Location of conduits and other equipment may be altered by Consultant without extra charge provided change is made before installation and does not necessitate major additional material.

- .2 As work progresses and before installing fixtures and other fittings and equipment which may interfere with interior treatment and use of building, provide detail drawings or obtain directions for exact location of such equipment and fitments.
- .3 Electrical drawings are diagrammatic. Where required work is not shown or only shown diagrammatically, install same at maximum height in space to conserve head room (minimum 2200 mm (88") clear) and interfere as little as possible with free use of space through which they can pass. Conceal wiring, conduits and ducts in furred spaces, ceilings and walls unless specifically shown otherwise. Install work close to structure so furring will be small as practical.
- .4 Before commencing work, check and verify all sizes, locations, grades, elevations, levels and dimensions to ensure proper and correct installation. Verify existing/municipal services.
- .5 Locate all electrical equipment in such a manner as to facilitate easy and safe access to and maintenance and replacement of any part.
- .6 Relocate equipment and/or material installed but not co-ordinated with work of other Sections as directed, without extra charge.
- .7 Where drawings are done in metric and product not available in metric, the corresponding imperial trade size shall be utilized.

1.6 INTERFERENCE AND CO-ORDINATION DRAWINGS

- .1 Prepare interference and equipment placing drawings to ensure that all components will be properly accommodated within the constructed spaces provided.
- .2 Prepare drawings to indicate co-ordination and methods of installation of a system with other systems where their relationship is critical. Ensure that all details of equipment apparatus, and connections are co-ordinated.
- .3 Ensure that clearances required by jurisdictional authorities and clearances for proper maintenance are indicated on drawings.
- .4 Upon consultant's request submit copies of interference drawings to consultant.

1.7 QUALITY ASSURANCE

- .1 The installations of the division must conform to the latest edition of the Electrical Safety Code as well as its supplemental bulletins and instructions. Provide materials and labour necessary to comply with rules, regulations, and ordinances.
- .2 Abbreviations for electrical terms: to CSA Z85-1983.
- .3 In case of differences between building codes, provincial laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Promptly notify Consultant in writing of such differences.

1.8 ALTERNATES AND SUBSTITUTIONS

- .1 Throughout these sections are lists of "Alternate Equipment" manufacturers acceptable to Consultant if their product meets characteristics of specified described equipment.

- .2 Each bidder may elect to use "Alternate Equipment" from lists of Alternates where listed. Include for any additional costs to suit Alternated used. Prices are not required in Tender for Alternates listed except where specifically noted as "Separate Price". Complete the Supplementary Tender Form.
- .3 It is responsibility of this Division to ensure "Alternate Equipment" fits space allocated and gives performance specified. If an "Alternate Equipment" unit is proposed and does not fit space allotted nor equal specified product in Consultant's opinion, supply of specified described equipment will be required without change in Contract amount. Only manufacturers listed will be accepted for their product listing. All other manufacturers shall be quoted as substitution stating conditions and credit amount.
- .4 If item of material specified is unobtainable, state in Tender proposed substitute and amount added or deducted for its use. Extra monies will not be paid for substitutions after Contract has been awarded.

1.9 EXAMINATION

- .1 Site Inspection
 - .1 Examine premises to understand conditions, which may affect performance of work of this Division before submitting proposals for this work.
 - .2 No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.
- .2 Drawings:
 - .1 Electrical Drawings show general arrangement of fixtures, power devices, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.
 - .2 Consider Architectural, Mechanical, and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over Electrical Drawings.
 - .3 Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories, which may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.
- .3 Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents. If approval is received by Addendum or Change Order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available.

1.10 SEQUENCING AND SCHEDULING

- .1 It is understood that while Drawings are to be followed as closely as circumstances permit, this Division will be held responsible for installation of systems according to the true intent and meaning of Contract Documents. Anything not clear or in conflict will be explained by making application to Consultant. Should conditions arise where certain changes would be advisable, secure Consultant's approval of these changes before proceeding with work.
- .2 Coordinate work of various trades in installing interrelated work. Before installation of electrical items, make proper provision to avoid interferences in a manner approved by Consultant. Changes required in work specified in these sections caused by neglect to do so shall be made at no cost to Owner.
- .3 Arrange fixtures, conduit, ducts, and equipment to permit ready access to junction boxes, starters, motors, control components, and to clear openings of doors and access panels.
- .4 Furnish and install inserts and supports required by these sections unless otherwise noted. Furnish sleeves, inserts, supports, and equipment that are an integral part of other Divisions of the Work to Sections involved in sufficient time to be built into construction as the Work proceeds. Locate these items and see that they are properly installed. Expense resulting from improper location or installation of items above shall be borne by the electrical trade.
- .5 Adjust locations of ducts, conduits, equipment, fixtures, etc, to accommodate work from interferences anticipated and encountered. Determine exact route and location of each conduit and duct prior to installation.
 - .1 Make offsets, transitions, and changes in direction of ducts, and electrical raceways as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.
 - .2 Supply and install pull boxes, etc, as required to effect these offsets, transitions, and changes in direction.

1.11 DRAW BREAKDOWN

- .1 This Contractor **MUST** submit a breakdown of the tender price into classifications to the satisfaction of the Consultant, with the aggregate of the breakdown totaling the total contract amount. **Each item must be broken out into material and labour costs.** Progress claims, when submitted are to be itemized against each item of the draw breakdown. This shall be done in table form showing contract amount, amount this draw, total to date, % complete and balance.
- .2 Breakdown shall be as follows:
 - .1 Permits and fees
 - .2 Mobilization (maximum 1%)
 - .3 Demolition
 - .4 Branch conduits
 - .5 Branch wiring
 - .6 Lighting fixtures / Controls (interior)
 - .7 Emergency lighting

- .8 Exterior lighting
- .9 Fire Alarm work
- .10 Commissioning / Contractor Closeout (minimum 3% but not less than \$5,000.00)
- .3 The breakdown must be approved by the Consultant prior to submission of the first draw.
- .4 Breakdowns not complying to the above will not be approved.
- .5 Breakdown must indicate total contract amount.
- .6 **Mobilization amount may only be drawn when all required shop drawings have been reviewed by the consultant.**

1.12 SHOP DRAWINGS AND PRODUCT DATA

- .1 General
 - .1 Furnish complete catalog data for manufactured items of equipment to be used in the Work to Consultant for review within 30 days after award of Contract.
 - .2 Provide a complete list of shop drawings to be submitted prior to first submission.
 - .3 Before submitting to the Consultant, review all shop drawings to verify that the products illustrated therein conform to the Contract Documents. By this review, the Contractor agrees that it has determined and verified all field dimensions, field construction criteria, materials, catalogue numbers, and similar data and that it has checked and coordinated each shop drawing with the requirements of the work and of the Contract Documents. The Contractor's review of each shop drawings shall be indicated by stamp, date and signature of a qualified and responsible person possessing by the appropriate authorization.
 - .4 If material or equipment is not as specified or submittal is not complete, it will be rejected by Consultant.
 - .5 Additional shop drawings required by the contractor for maintenance manuals, site copies etc., shall be photocopies of the "reviewed" shop drawings. All costs to provide additional copies of shop drawings shall be borne by the contractor.
 - .6 **Submit all shop drawings for the project as a package. Partial submittals will not be accepted.**
 - .7 Catalog data or shop drawings for equipment, which are noted as being reviewed by Consultant or his Engineer shall not supersede Contract Documents.
 - .8 Review comments of Consultant shall not relieve this Division from responsibility for deviations from Contract Documents unless Consultant's attention has been called to such deviations in writing at time of submission, nor shall they relieve this Division from responsibility for errors in items submitted.
 - .9 Check work described by catalog data with Contract Documents for deviations and errors.
 - .10 Shop drawings and product data shall show:
 - .1 Mounting arrangements.

- .2 Operating and maintenance clearances. e.g. access door swing spaces.
- .11 Shop drawings and product data shall be accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Manufacturer test data where requested.
 - .3 Manufacturer to certify as to current model production.
 - .4 Certification of compliance to applicable codes.
- .12 State sizes, capacities, brand names, motor HP, accessories, materials, gauges, dimensions, and other pertinent information. List on catalog covers page numbers of submitted items. Underline applicable data.
- .13 Once these shop drawings are returned “reviewed” or “reviewed as noted” fabrication, production, and installation may commence. **NOTE: If a shop drawing is returned “reviewed as noted” this Contractor must provide written indication that the comments have been complied with.**

A partial list of shop drawings includes:

 - .1 Light Fixtures
 - .2 Emergency battery units and fixtures
 - .3 Firestopping materials
 - .4 Wiring devices
 - .5 Occupancy sensors
- .2 Submissions shall be submitted electronically as per the following directions:
 - .1 Electronic Submissions:
 - .1 Electronically submitted shop drawings shall be prepared as follows:
 - .1 Use latest software to generate PDF files of submission sheets.
 - .2 Scanned legible PDF sheets are acceptable. Image files are not acceptable.
 - .3 PDF format shall be of sufficient resolution to clearly show the finest detail.
 - .4 PDF page size shall be standardized for printing to letter size (8.5"x11"), portrait with no additional formatting required by the consultant. Submissions requiring larger detail sheets shall not exceed 11"x17".
 - .5 Submissions shall contain multiple files according to section names as they appear in Specification.
 - .6 File names shall include consultant project number and description of shop drawing section submitted.
 - .7 Each submission shall contain an index sheet listing the products submitted, indexed in the same order as they appear in the Specification. Include associated PDF file name for each section.
 - .8 On the shop drawing use an “electronic mark” to indicate what is being provided.

- .9 **Each file shall bear an electronic representation of the “company stamp” of the contractor. If not stamped the file submission will not be reviewed.**
- .2 Email submissions shall include subject line to clearly identify the consultants’ project number and the description of the shop drawings submitted.
- .3 Electronic attachments via email shall not exceed 10MB. For submissions larger than 10MB, multiple email messages shall be used. Denote related email messages by indicating “1 of 2” and “2 of 2” in email subject line for the case of two messages.
- .4 Electronic attachments via web links (URL) shall directly reference PDF files. Provide necessary access credentials within link or as username/password clearly identified within body of email message.
- .5 On site provide one copy of the “reviewed” shop drawings in a binder as noted above.
- .6 Contractor to print copies of “reviewed” shop drawings and compile into maintenance manuals in accordance with requirements detailed in this section.

1.13 CARE, OPERATION AND START-UP

- .1 Instruct Consultant and operating personnel in the operation, care and maintenance of equipment.
- .2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components.
- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with all aspects of its care and operation.

1.14 VOLTAGE RATINGS

- .1 Operating voltages: to CAN3-C235-83.

1.15 PERMITS, FEES AND INSPECTION

- .1 The contractor is required to include in his tender all required inspection costs by the Electrical Safety Authority. Permit application is the responsibility of the contractor.
- .2 Reproduce drawings and specifications required by Electrical Safety Authority at no cost.
- .3 Notify Consultant of changes required by Electrical Safety Authority prior to making changes.
- .4 Furnish Certificates of Acceptance to Engineer from Electrical Safety Authority and other authorities having jurisdiction upon completion of work.
- .5 This contractor must furnish any certificates required to indicate that the work completed conforms with laws and regulations of authorities having jurisdiction.

1.16 MATERIALS AND EQUIPMENT

- .1 Equipment and material to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Electrical Safety Authority.

1.17 ELECTRIC MOTORS, EQUIPMENT, AND CONTROLS

- .1 Supplier and installer responsibility is indicated in the Equipment Wiring Schedule on electrical drawings.
- .2 Control wiring and conduit is specified in the Electrical specifications except for conduit, wiring and connections below 50 V, which are related to control systems specified in the Mechanical specifications.

1.18 FINISHES

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
 - .1 Paint outdoor electrical equipment "equipment green" finish.
 - .2 Paint indoor switchgear and distribution enclosures light grey.
- .2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .3 Clean and prime exposed non-galvanized hangers, racks, fastenings, and conduits etc. to prevent rusting.

1.19 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates as follows:
- .2 Nameplates:
 - .1 Lamicoid 3 mm (1/8") thick plastic engraving sheet, black face, white core, mechanically attached with self tapping screws.

NAMEPLATE SIZES

Size 1	9 mm x 50 mm (3/8" x 2")	1 line	3 mm (1/8") high letters
Size 2	12 mm x 70 mm (1/2" x 2 1/2")	1 line	5 mm (3/16") high letters
Size 3	12 mm x 70 mm (1/2" x 2 1/2")	2 lines	3 mm (1/8") high letters
Size 4	20 mm x 90 mm (3/4" x 3 1/2")	1 line	9 mm (3/8") high letters
Size 5	20 mm x 90 mm (3/4" x 3 1/2")	2 lines	5 mm (3/16") high letters
Size 6	25 mm x 100 mm (1" x 4")	1 line	12 mm (1/2") high letters
Size 7	25 mm x 100 mm (1" x 4")	2 lines	6 mm (1/4") high letters

- .3 Wording on nameplates labels to be approved by Consultant prior to manufacture.
- .4 Allow for average of twenty-five (25) letters per nameplate.
- .5 Identification to be English.
- .6 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.

- .7 Nameplates for disconnects, starters and contactors must indicate equipment being controlled and voltage.
- .8 Nameplates for transformers must indicate transformer label as indicated and capacity, primary, and secondary voltages.

1.20 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour code: to CSA C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

1.21 CONDUIT AND CABLE IDENTIFICATION

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m (45') intervals.
- .3 Colour bands must be 25 mm (1") wide.

	<u>Prime</u>
up to 208 V	yellow
209 to 600 V	white
Data System	orange
- .4 This contractor must paint all system junction boxes and covers in conformance with the above schedule.

1.22 PROTECTION OF OPENINGS

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

1.23 WIRING TERMINATIONS

- .1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

1.24 MANUFACTURERS AND CSA LABELS

- .1 All labels must be visible and legible after equipment is installed.

1.25 WARNING SIGNS

- .1 To meet requirements of Electrical Safety Authority and Consultant.
- .2 Provide porcelain enamel signs, with a minimum size of 175 mm x 250 mm (7" x 10").

1.26 LOCATION OF OUTLETS

- .1 Do not install outlets back-to-back in wall; allow minimum 150 mm (6") horizontal clearance between boxes.
- .2 Change location of outlets at no extra cost or credit, providing distance does not exceed 3 m (10'), and information is given before installation.
- .3 Locate light switches on latch side of doors. Locate disconnect devices in mechanical and elevator machine rooms on latch side of door.

1.27 MOUNTING HEIGHTS

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise. Coordinate with block coursing (if applicable).
- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.
- .3 Install electrical equipment at following heights unless indicated otherwise.
 - .1 Local switches: 1100 mm (42").
 - .2 Voice/Data outlets: At height of adjacent outlet or at 400 mm (16").
 - .3 Emergency call switches and/or pushbuttons: 900 mm (36").

1.28 LOAD BALANCE

- .1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
- .2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.
- .3 Submit, at completion of work, report listing phase and neutral currents on panelboards, dry-core transformers and motor control centres, operating under normal load. State hour and date on which each load was measured, and voltage at time of test.

1.29 FIELD QUALITY CONTROL

- .1 Conduct and pay for following tests:
 - .1 Power distribution system including phasing, voltage, grounding, and load balancing.
 - .2 Circuits originating from branch distribution panels.
 - .3 Lighting and its control.
- .2 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.
- .3 Insulation resistance testing.
 - .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
 - .2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.
 - .3 Check resistance to ground before energizing.

- .4 Carry out tests in presence of Consultant.
- .5 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .6 Submit test results for Consultant's review.

1.30 GUARANTEE AND WARRANTY

- .1 At the substantial completion stage of this project this Contractor must provide a written guarantee indicating that any defects, not due to ordinary wear and tear or improper use which occur within the first year from the date of substantial completion will be corrected at the contractors expense.
- .2 **If the electrical sub-contractor's office is 50 kilometers (30 miles) or more from the project site, the sub-contractor is to provide a service/warranty work agreement for warranty period with a local electrical sub-contractor approved by Consultant. Include copy of service/warranty agreement in warranty section of operation and maintenance manual.**
- .3 Warranty period shall start from date of substantial completion.
- .4 Refer to individual specification sections for information on any special manufacturer's equipment warranties.

1.31 SYSTEM START UP

- .1 Provide consultant with written notice verifying all equipment operation and installation is complete prior to scheduled start-up period.
- .2 Start up shall be in presence of the following: owner or representative, contractor, and manufacturer's representative. Each person shall witness and sign off each piece of equipment. Consultant's attendance will be determined by consultant.
- .3 Arrange with all parties and provide 72 hours notice for start up procedure.
- .4 Simulate system start up and shut down and verify operation of each piece of equipment.
- .5 These tests are to demonstrate that the systems and equipment installed are operational as specified.
- .6 The contractor must describe during the start up session the required maintenance for each piece of equipment according to the manufacturer.
- .7 The contractor must provide all necessary tools (including a digital multimeter) to successfully complete the start up procedure.

1.32 OPERATION AND MAINTENANCE MANUAL

- .1 Provide operation and maintenance data for incorporation into manual as specified in other Sections of this Division.

- .2 Operation and maintenance manual to be approved by, and final copies deposited with, Consultant before final inspection. Make changes as requested and re-submit as directed by Consultant.
- .3 Submit one manual for approval. Manuals will be required at project completion. Each of which shall be in a three ring binder (minimum 50 mm (2") ring) labelled:
 - .1 Operation and Maintenance Manual.
 - .2 Project Name.
 - .3 Location.
- .4 Each manual must include (in "tabbed" sections) the following:
 - .1 Index
 - .2 List of General, Mechanical, Electrical Contractors and all associated sub-contractor names, addresses and contact numbers.
 - .3 List of suppliers and equipment wholesalers local to the project.
 - .4 One year warranty letter for all parts, equipment and workmanship.
 - .5 List of manufacturers, spare parts list and source.
 - .6 Copy of typewritten schedules for all new and renovated panels.
 - .7 Final certificate from the Electrical Safety Authority.
 - .8 Certificate of exit/emergency lighting testing as per the specification.
 - .9 Copy of electrical shop drawings which have been stamped and reviewed by Consultant
 - .10 Any special warranties on equipment required (i.e. LED lighting, digital lighting control).
- .5 Upon acceptance of Operation and Maintenance Manual by the consultant, a pdf file of the entire manual is to be provided on a USB stick. Only one USB stick is to be provided containing both the approved manuals and as-built drawings.

1.33 AS-BUILT DRAWINGS

- .1 Site records:
 - .1 Contractor shall provide 2 sets of reproducible electrical drawings. Provide sets of white prints as required for each phase of the work. Mark thereon all changes as work progresses and as changes occur. This shall include field and contract changes to electrical systems.
 - .2 On a weekly basis, transfer information to reproducibles, revising reproducibles to show all work as actually installed.
 - .3 Use different colour waterproof ink for each service.
 - .4 Make available for reference purposes and inspection at all times.
- .2 As-built drawings:
 - .1 Identify each drawing in lower right hand corner in letters at least 3 mm (1/8") high as follows: - "AS-BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW ELECTRICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (date).

- .2 Submit hard copy to Consultant for approval. When returned, make corrections (if any) as directed.
- .3 Once approved, submit completed reproducible paper as-built drawings as well as a scanned pdf file copy on USB stick with Operating and Maintenance Manuals.

1.34 DEMONSTRATION AND OPERATING AND MAINTENANCE INSTRUCTIONS

- .1 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .2 Manufacturers or their representatives are to provide demonstrations and instructions.
- .3 Use operation and maintenance manual, As-built drawings, audio visual aids, etc. as part of instruction materials.
- .4 Instruction duration time requirements as specified in appropriate sections.
- .5 Where deemed necessary, Consultants may record these demonstrations on video tape for future reference.

1.35 SUBSTANTIAL PERFORMANCE

- .1 Complete the following to the satisfaction of the consultant prior to submission of substantial performance.
 - .1 As-built Drawings.
 - .2 Maintenance Manuals.
 - .3 System Start up.
 - .4 Instructions to Owners.
 - .5 Final Certificates (Electrical Safety Authority, Emergency Lighting).

1.36 TRIAL USAGE

- .1 Consultant or owner may use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.

1.37 REVISION TO CONTRACT

- .1 Provide the following for each item in a given change notice:
 - .1 Itemized list of material with associated costs.
 - .2 Labour rate and itemized list of labour for each item.
 - .3 Copy of manufacturers/suppliers invoice if requested.

1.38 EQUIPMENT SUPPORTS

- .1 Equipment supports supplied by equipment manufacturer: shall be installed by the electrical contractor.
- .2 Equipment supports not supplied by equipment manufacturer: fabricate from structural grade steel meeting requirements of - Structural Steel Section. Submit structural calculations with shop drawings if necessary.

- .3 This contractor shall be responsible for providing all anchor bolts and associated formed concrete bases for lighting standards as detailed.

1.39 SLEEVES

- .1 Pipe sleeves: at points where pipes pass through masonry, concrete, or fire rated assemblies and as indicated.
- .2 Schedule 40 steel pipe.
- .3 Sleeves with annular fin continuously welded at midpoint:
 - .1 Through foundation walls.
 - .2 Where sleeve extends above finished floor.
- .4 Sizes: minimum 6 mm (1/4") clearance all around, between sleeve and conduit.
- .5 Terminate sleeves flush with surface of concrete and masonry walls, concrete floors on grade and 25 mm (1") above other floors.
- .6 Through foundation walls PVC sleeves are acceptable.
- .7 Fill voids around pipes:
 - .1 Caulk between sleeve and pipe in foundation walls and below grade floors with waterproof fire retardant non-hardening mastic.
 - .2 Where sleeves pass through walls or floors, provide space for firestopping. Where pipes/ducts pass through fire rated walls, floors and partitions, maintain fire rating integrity.
 - .3 Fill future-use sleeves with easily removable filler.

1.40 FIRESTOPPING

- .1 Firestopping material and installation within annular space between conduits, ducts, and adjacent fire separation.
- .2 Provide materials and systems capable of maintaining effective barrier against flame, smoke, and gases.
- .3 Comply with the requirements of CAN4-S115-M35, and do not exceed opening sized for which they have been tested.
- .4 Systems to have an F or FT rating (as applicable) not less than the fire protection rating required for closures in a fire separation.
- .5 Provide "firewrap" blanket around services penetrating firewalls. Extent of blanket must correspond to ULC recommendations. In general wrap individual conduits with approved firewrap materials on each side of firewall. Refer to architectural drawings for FT ratings. Provide 1 and/or 2 layers of firewrap with transverse and longitudinal seams overlapped and/or butted (second layer offset from first layer). Cut edges are to be sealed with aluminum foil tape. Provide 50 mm stainless steel banding at 200 mm intervals. Install firewrap to manufacturers' recommendations for proper FT rating. Acceptable manufacturers are 3M Firemaster ductwrap or approved equal.

- .6 The firestopping materials are not to shrink, slump or sag and be free of asbestos, halogens and volatile solvents.
- .7 Firestopping materials are to consist of a component sealant applied with a conventional caulking gun and trowel.
- .8 Firestop materials are to be capable of receiving finish materials in those areas, which are exposed and scheduled to receive finishes.
- .9 Firestopping shall be inspected and approved by local authority prior to concealment or enclosure.
- .10 Install material and components in accordance with ULC certification, manufacturers instructions and local authority.
- .11 Submit product literature and installation material on firestopping in shop drawing and product data manual.**
- .12 Acceptable manufacturers:
 - .1 Fyresleeve Industries Inc.
 - .2 General Electric Pensil Firestop Systems
 - .3 International Protective Coatings Corp.
 - .4 Rectorseal Corporation (Metacaulk)
 - .5 Proset Systems
 - .6 3M
 - .7 AD Systems
 - .8 Hilti
 - .9 Royal

Note: Fire stop material must conform to requirements of local authorities having jurisdiction. Contractor to confirm prior to application and ensure material used is compatible with that used by other trades on site.

- .13 Ensure firestop manufacturer representative performs on site inspections and certifies installation. Submit inspection reports/certification at time of substantial completion.

1.41 PAINTING

- .1 Refer to Section Interior Painting and specified elsewhere.
- .2 Apply at least one coat of corrosion resistant primer paint to ferrous supports and site fabricated work.
- .3 Prime and touch up marred finished paintwork to match original.
- .4 Restore to new condition, or replace equipment at discretion of consultant, finishes which have been damaged too extensively to be merely primed and touched up.

1.42 ACCESS DOORS

- .1 Supply access doors to concealed electrical equipment for operating, inspecting, adjusting and servicing.

- .2 Flush mounted 600 mm x 600 mm (24" x 24") for body entry and 300 mm x 300 mm (12" x 12") for hand entry unless otherwise noted. Doors to open 180°, have rounded safety corners, concealed hinges, screwdriver latches and anchor straps.
- .3 Material:
 - .1 Special areas such as tiled or marble surfaces: use stainless steel with brushed satin or polished finish as directed by Consultant.
 - .2 Remaining areas: use prime coated steel.
 - .3 Fire rated areas: provide ULC listed access doors
- .4 Installation:
 - .1 Locate so that concealed items are accessible.
 - .2 Locate so that hand or body entry (as applicable) is achieved.
 - .3 Installation is specified in applicable sections.
- .5 Acceptable materials:
 - .1 Le Hage
 - .2 Zurn
 - .3 Acudor
 - .4 Nailor Industries Inc.

1.43 DELIVERY STORAGE & HANDLING

- .1 Follow Manufacturer's directions in delivery, storage, and protection, of equipment and materials.
- .2 Deliver equipment and material to site and tightly cover and protect against dirt, water, and chemical or mechanical injury, but have readily accessible for inspection. Store items subject to moisture damage (such as controls) in dry, heated space.

1.44 REPAIR, CUTTING, CORING AND RESTORATION

- .1 Be responsible for required digging, cutting, and patching incident to work of this Division and make required repairs afterwards to satisfaction of Consultant. Cut carefully to minimize necessity for repairs to existing work. Do not cut beams, columns, or trusses.
- .2 Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown. Surface finishes shall exactly match existing finishes of same materials.
- .3 Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.
- .4 Cutting, patching, repairing, and replacing pavements, sidewalks, roads, and curbs to permit installation of work of this Division is responsibility of Section installing work.
- .5 Slots, cores and openings through floors, walls, ceilings, and roofs shall be provided by this contractor but performed by a trade specializing in this type of work. This Division shall see that they are properly located and do any cutting and patching caused by its neglect to do so.

1.45 EXISTING SYSTEMS

- .1 Connections into existing systems to be made at time approved by Consultant. Request written approval of time when connections can be made.
- .2 Be responsible for damage to existing plant by this work.

1.46 CLEANING

- .1 Clean interior and exterior of all electrical equipment provided including light fixture lenses.
- .2 In preparation for final acceptance, clean and refurbish all equipment and leave in operating condition.

1.47 DISCONNECTION AND REMOVAL

- .1 Disconnect and/or remove equipment as indicated.
- .2 Cap and conceal all redundant and obsolete connections.
- .3 Provide a list of equipment to be removed to the owner, for his acceptance of same. Remove all equipment from site, which the owner does not retain.
- .4 Store equipment to be retained by owner on site where directed by consultant.

1.48 ENCLOSURES

- .1 This contractor must ensure that all electrical equipment mounted in sprinklered areas is provided with an enclosure in conformance with the Electrical Safety Code.

END OF SECTION

Part 1 General

1.1 GENERAL PROVISIONS

- .1 Conform to the General Provisions of Division 1 and Electrical General Requirements Section.
- .2 This project is one of a retrofit nature in part, and which will require extensive demolition.
- .3 Allow for all remedial work in areas indicated on the drawings and as generally defined in the relevant sections of the specifications.

1.2 SCOPE OF WORK

- .1 The scope of work is essentially the selected disconnection and/or removal of services and/or equipment, devices etc. as indicated or required to complete the work.

Part 2 Products

2.1 GENERAL

- .1 This Division is to liaise with the Owners or Consultant for equipment being removed that may be suitable for reuse to that specified or handed over to the owner.
- .2 This Division to take full responsibility for any special tools or equipment required to disassemble or remove material from building.

Part 3 Execution

3.1 GENERAL

- .1 The general requirements are indicated on the drawings and on the outline specification in Division 1.
- .2 The general execution of the demolition is to be carried out in a clean and efficient manner.
- .3 Demolition of existing ceiling, walls etc., to facilitate removal of existing services or equipment or installation of new to be kept to a minimum and then restored to match existing.
- .4 All openings or holes created by removal of existing electrical systems which are not being reused are to be patched with the same material surrounding surfaces.
- .5 All new holes and openings to facilitate electrical systems are to be patched to match surrounding surfaces.
- .6 Protect all existing furnishings materials and equipment. Any damage occurring as a result of the work of this Division shall be repaired or replaced at the expense of this Division.

- .7 Where work involves breaking into or connecting to existing services, carry out work at times directed by the Owners in an expedient manner with minimum disruption to the facility and systems downtime.
- .8 Where unknown services are encountered immediately advise Consultant and confirm findings in writing.
- .9 Where the location of any services has been shown on the plans, such information is not guaranteed. It is this Division's responsibility to verify locations, etc., immediately after moving on site. Should for any reason the information obtained necessitates changes in procedure or design, advise the Consultant at once. If verification of existing conditions is not done at the outset and any problems arise, the responsibility for same is entirely this Division's.
- .10 Disconnect and/or remove equipment, devices, cabling, services, etc. as indicated.
- .11 Remove all redundant and obsolete systems, connections, and wiring.
- .12 Provide a list of equipment to be removed to the owner, for their acceptance of same. Remove all equipment from site that the owner does not retain.
- .13 Maintain equipment to be retained by owner on site where directed by consultant.
- .14 Demolition shall take place within areas isolated from all other areas with appropriate hoarding, scaffolding, netting, fencing or other means of security between building users and the work.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 CSA C22.2 No.0.3-92, Test Methods for Electrical Wires and Cables.
- .2 CAN/CSA-C22.2 No.131-M89(R1994), Type TECK 90 Cable.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with Electrical General Requirements Section.

Part 2 Products

2.1 BUILDING WIRES

- .1 Conductors: stranded for 10 AWG and larger.
- .2 Minimum size: 12 AWG.
- .3 Copper conductors: size as indicated, with 600 V insulation of chemically cross-linked thermosetting polyethylene material 90°C (194°F) rated T90 for indoor above grade installations and RW90 for below grade installations.

2.2 TECK CABLE

- .1 Cable: to CAN/CSA-C22.2 No.131.
- .2 Conductors:
 - .1 Grounding conductor: copper.
 - .2 Circuit conductors: copper, size as indicated.
- .3 Inner jacket: polyvinyl chloride material.
- .4 Armour: aluminum.
- .5 Overall covering: polyvinyl chloride material.
- .6 Fastenings:
 - .1 One hole steel zinc straps to secure surface cables 50 mm (2") and smaller. Two hole steel straps for cables larger than 50 mm (2").
 - .2 Channel type supports for two or more cables at 1500 mm (60") centres.
 - .3 Threaded rods: 6 mm (1/4") diameter to support suspended channels.
- .7 Connectors must be suitable for:
 - .1 Installed environment and approved for use with TECK cable.

2.3 ARMOURED CABLES

- .1 Conductors: insulated, copper minimum size as indicated above.
- .2 Type: AC90 (minimum size 12 AWG).

- .3 Armour: interlocking type fabricated from aluminum strip.
- .4 Connectors must be suitable for installed environment and approved for use with armoured cable.

Part 3 Execution

3.1 INSTALLATION OF BUILDING WIRES

- .1 Install wiring from source to load through raceways as specified.
- .2 Provide separate neutral conductors for all lighting circuits and circuits originating from surge protected panels. Size raceways accordingly.

3.2 INSTALLATION OF TECK CABLE 0 - 1000 V

- .1 Group cables wherever possible on channels.
- .2 Terminate cables in accordance with Wire and Box Connectors - 0 - 1000 V Section.

3.3 INSTALLATION OF ARMOURED CABLES

- .1 Group cables wherever possible.
- .2 Terminate cables in accordance with Wire and Box Connectors - 0 - 1000 V Section.
- .3 These cables are to be installed in concealed locations only. These concealed locations are considered to be stud walls and “drops” to stud walls, lighting fixtures, and ceiling mounted devices.
- .4 **These “drops” shall not be permitted to exceed 2.4 m (8'-0”). To limit these “drops” to lengths noted above provide additional branch wiring in conduit.**

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data for cabinets in accordance with Electrical General Requirements Section.

Part 2 Products

2.1 MATERIALS

- .1 Splitters must conform to CSA C22.2 No. 76 (latest edition).
- .2 Junction and pull boxes must conform to CSA C22.2 No. 40 (latest edition)

2.2 JUNCTION AND PULL BOXES

- .1 Welded steel construction with screw-on flat covers for surface mounting.
- .2 Covers with 25 mm (1") minimum extension all around, for flush-mounted pull and junction boxes.

Part 3 Execution

3.1 JUNCTION AND PULL BOXES INSTALLATION

- .1 Install pull boxes in inconspicuous but accessible locations.
- .2 Install junction and pull boxes so as not to exceed 30 m (100') of conduit run between pull boxes and in conformance with the Electrical Safety Code.

3.2 IDENTIFICATION

- .1 Provide equipment identification in accordance with General Electrical Requirements Section.
- .2 Install size 2 identification labels indicating system name, voltage and phase.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Outlet boxes, conduit boxes, and fittings must conform to CSA C22.2 No. 18 (latest edition).

Part 2 Products

2.1 OUTLET AND CONDUIT BOXES GENERAL

- .1 Size boxes in accordance with CSA C22.1.
- .2 102 mm (4") square or larger outlet boxes as required for special devices.
- .3 Gang boxes where wiring devices are grouped.
- .4 Blank cover plates for boxes without wiring devices.
- .5 347 V outlet boxes for 347 V switching devices.
- .6 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 SHEET STEEL OUTLET BOXES

- .1 Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 76 mm x 50 mm x 64 mm (3" x 2" x 2½") or as indicated. 102 mm (4") square outlet boxes when more than one conduit enters one side with extension and plaster rings as required. Iberville 1104 Series.
- .2 Electro-galvanized steel utility boxes for outlets connected to surface-mounted EMT conduit **in utility rooms**, minimum size 102 mm x 57 mm x 38 mm (4" x 2¼" x 1½"). Iberville 1110 Series.
- .3 102 mm (4") square or octagonal outlet boxes for lighting fixture outlets.
- .4 102 mm (4") square outlet boxes with extension and plaster rings for flush mounting devices in finished tile walls.

2.3 MASONRY BOXES

- .1 Electro-galvanized steel masonry single and multi gang boxes for devices flush mounted in exposed block walls.

2.4 CONDUIT BOXES

- .1 Cast FS or FD feraloy boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacle **in areas (other than utility rooms) where surface conduit is used.**

2.5 OUTLET BOXES FOR NON-METALLIC SHEATHED CABLE

- .1 Electro-galvanized, sectional, screw ganging steel boxes, minimum size 76 mm 50 mm x 63 mm (3" x 2" x 2-1/2") with two double clamps to take non-metallic sheathed cables.

2.6 FITTINGS- GENERAL

- .1 Bushing and connectors with nylon insulated throats.
- .2 Knock-out fillers to prevent entry of debris.
- .3 Conduit outlet bodies for conduit up to 32 mm (1- 1/4") and pull boxes for larger conduits.
- .4 Double locknuts and insulated bushings on sheet metal boxes.

Part 3 Execution

3.1 INSTALLATION

- .1 Support boxes independently of connecting conduits.
- .2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.
- .3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm (1/4") of opening.
- .4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.
- .5 Outlets if unwired are to be provided with blank coverplates to suit related sections of this specification.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 CSA C22.2 No.65-1956(R1965) Wire Connectors.

Part 2 Products

2.1 MATERIALS

- .1 Pressure type wire connectors: with current carrying parts of copper sized to fit copper conductors as indicated.
- .2 Fixture type splicing connectors: with current carrying parts of copper sized to fit copper conductors 10 AWG or less.
- .3 Clamps or connectors for armoured cable, and flexible conduit, as required.

Part 3 Execution

3.1 INSTALLATION

- .1 Remove insulation carefully from ends of conductors and:
 - .1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.
 - .2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No.65.
 - .3 Install fixture type connectors and tighten. Replace insulating cap.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA C22.2 No.18-92, Outlet Boxes, Conduit Boxes, and Fittings.
 - .2 CSA C22.2 No.56-1977(R1977), Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .3 CSA C22.2 No.83-M1985(R1992), Electrical Metallic Tubing.
 - .4 CSA C22.2 No.211.2-M1984(R1992), Rigid PVC (Unplasticized) Conduit.
 - .5 CAN/CSA C22.2 No.227.3-M91, Flexible Nonmetallic Tubing.

Part 2 Products

2.1 CONDUITS

- .1 Epoxy coated conduit: to CSA C22.2 No.45, with zinc coating and corrosion resistant epoxy finish inside and outside.
- .2 Electrical metallic tubing (EMT) with couplings: to CSA C22.2 No.83.
- .3 Rigid PVC conduit: to CSA C22.2 No.211.2.
- .4 Flexible metal conduit: to CSA C22.2 No.56, aluminum and liquid-tight flexible metal.
- .5 Flexible PVC conduit: to CAN/CSA C22.2 No.227.3, ENT.

2.2 CONDUIT FASTENINGS

- .1 One hole steel straps to secure surface conduits 53 mm (2") and smaller. Two hole steel straps for conduits larger than 53 mm (2").
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 Channel type supports for two or more conduits at 1.5 m (5'0") oc.
- .4 Threaded rods, 6 mm (1/4") diameter, to support suspended channels.

2.3 CONDUIT FITTINGS

- .1 EMT fittings shall be set screw style (zinc alloy).
- .2 Flexible metal conduit fittings shall be screw-in type.
- .3 Liquid type flexible metal conduit fittings shall be sealtite type.
- .4 PVC fittings shall be PVC type complete with PVC adaptors at all boxes.
- .5 Coating: same as conduit.
- .6 Factory "ells" where 90° bends are required for 27 mm (1") and larger conduits.
- .7 Where bushings are noted to be provided they must be "screwed" type fastened to a conduit connector. Push-fit or glued in place bushings will NOT be accepted.

2.4 FISH CORD

- .1 Nylon twine.

Part 3 Execution

3.1 INSTALLATION

- .1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .2 Conceal conduits except in mechanical/ electrical service rooms and in unfinished areas.
- .3 Use electrical metallic tubing (EMT) for all branch circuits unless specified otherwise.**
- .4 Use rigid PVC conduit underground and in kitchen areas.
- .5 Use flexible metal conduit for connection to motors in dry areas, connection to recessed fixtures without a prewired outlet box, connection to surface or recessed fixtures, work in movable metal partitions.
- .6 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations and for connections to kitchen equipment.
- .7 Conduits terminating at electrical equipment in sprinklered areas are to be provided with insulated compression style connectors equal to Thomas & Betts Cat. #TC8XXSC or approved equal.
- .8 **Minimum conduit size for branch circuits shall be 21 mm (3/4").** Single drops from ceiling mounted junction boxes down to a light switch or duplex receptacle may be reduced to 16 mm (1/2").
- .9 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .10 Mechanically bend steel conduit over 27 mm (1") diameter.
- .11 Install fish cord in empty conduits.
- .12 Run 2- 27 mm (1") spare conduits up to accessible ceiling space from each flush panel. Terminate these conduits in 152 mm x 152 mm x 102 mm (6" x 6" x 4") junction boxes in ceiling space.
- .13 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
- .14 Dry conduits out before installing wire.

3.2 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Locate conduits behind infrared or gas fired heaters with 1.5 m (5') clearance.
- .3 Run conduits in flanged portion of structural steel.
- .4 Group conduits wherever possible on suspended or surface channels.

- .5 Do not pass conduits through structural members except as indicated.
- .6 Do not locate conduits less than 75 mm (3") parallel to steam or hot water lines with minimum of 25 mm (1") at crossovers.
- .7 Do not fasten surface conduit larger than 25 mm (1") to roof deck. Provide standoffs or supports as manufactured by Caddy or use unistrut trapeze fastened to structure.**

3.3 CONCEALED CONDUITS

- .1 Do not install horizontal runs in masonry walls.
- .2 Do not install conduits in terrazzo or concrete toppings.

END OF SECTION

Part 1 General

1.1 PRODUCT DATA

- .1 Submit product data in accordance with Electrical General Requirements Section.

Part 2 Products

2.1 BREAKERS GENERAL

- .1 Moulded case circuit breakers must conform to CSA C22.1 No.5.1-M91 (latest edition.)
- .2 Bolt-on moulded case circuit breaker quick-make, quick-break type, for manual and automatic operation.
- .3 Common-trip breakers: with single handle for multi-pole applications.
- .4 Unless otherwise indicated moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

Part 3 Execution

3.1 INSTALLATION

- .1 Install circuit breakers as indicated complete with all necessary mounting hardware and filler panels if necessary.

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Electrical General Requirements Section.

Part 2 Products

2.1 SWITCHES

- .1 General purpose AC switches must conform to CSA C22.2 No. 111 (latest edition).
- .2 15 or 20 A, 120 V, single pole, double pole, three-way, four-way, keyed, or motor rated switches complete with pilot light.
- .3 Manually-operated general purpose ac switches with following features:
 - .1 Terminal holes approved for No. 10 AWG wire.
 - .2 Silver alloy contacts.
 - .3 Urea or melamine molding for parts subject to carbon tracking.
 - .4 Suitable for back and side wiring.
 - .5 Toggle style (Rocker style) (architect to select colour).
- .4 Toggle operated fully rated for tungsten filament and fluorescent lamps, and up to 80% of rated capacity of motor loads.
- .5 Switches of one manufacturer throughout project.
- .6 Acceptable materials:
 - single pole: Hubbell Cat # HBL1201
 - three way: Hubbell Cat # HBL1203
 - four way: Hubbell Cat # HBL1204
 - Keyed: Hubbell Cat. #HBL1221 Series complete with 2 keys per switch
 - (Keys): Hubbell Cat. #HBL1209
 - Motor rated: Hubbell Cat. #HBL1221PL c/w pilot light (20 A):
- .7 Acceptable alternate manufacturers include:
 - .1 Pass & Seymour
 - .2 Leviton.

2.2 RECEPTACLES

- .1 Receptacles, plugs, and other similar wiring devices must conform to CSA 22.2 No 42 (latest edition).
- .2 Duplex receptacles, CSA type 5-15 R, 125 V, 15 A, U ground, with following features (20A where noted):
 - .1 Urea molded housing (Colour by architect).
 - .2 Suitable for No. 10 AWG for back and side wiring.
 - .3 Break-off links for use as split receptacles.
 - .4 Eight back wired entrances, four side wiring screws.
 - .5 Triple wipe contacts and rivetted grounding contacts.
- .3 Other receptacles with ampacity and voltage as indicated.
- .4 Receptacles of one manufacturer throughout project.
- .5 Acceptable materials:

Standard duplex receptacle	Hubbell Cat # HBL5252CN
Ground fault protected T-slot receptacles	Hubbell Cat. # GF20L A complete with Decora style coverplate to suit specification below
T-slot receptacles	Hubbell Cat. #HBL5352

- .6 Acceptable alternate manufacturers include:
 - .1 Pass & Seymour
 - .2 Leviton

2.3 COVER PLATES

- .1 Cover plates from one manufacturer throughout project.
- .2 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.
- .3 Stainless steel, brushed, 1 mm (1/32") thick cover plates for wiring devices mounted in
- .4 Sheet metal cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.

2.4 DIMMER CONTROL

- .1 Dimmers are to be provided complete with the following features:
 - .1 Rating of 15 A 120 V.
 - .2 Wattage to suit load as indicated on drawings (minimum 1000W).
 - .3 Thin profile linear slide control only. (Rotary controls will not be accepted).
 - .4 Dimmer must provide full range of illumination from zero to full intensity.
 - .5 Integral on/off switch.
 - .6 Devices must mount in single gang box or multi-ganged where noted.
 - .7 Device and faceplate colour must match other wiring devices.
 - .8 Acceptable manufacturers:
 - .1 Leviton Renoir Series

- .2 Lutron Lumea 2 Series
- .3 Hubbell AS103 Series

Part 3 Execution

3.1 INSTALLATION

- .1 Switches:
 - .1 Install single throw switches with handle in "UP" position when switch closed.
 - .2 Install switches in gang type outlet box when more than one switch is required in one location.
 - .3 Mount toggle switches at height specified in Electrical General Requirements Section or as indicated.
- .2 Receptacles:
 - .1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.
 - .2 Mount receptacles at height specified in Electrical General Requirements Section or as indicated.
 - .3 Where split receptacle has one portion switched mount vertically and switch upper portion.
- .3 Cover plates:
 - .1 Protect stainless steel cover plate finish with paper or plastic film until painting and other work is finished.
 - .2 Install suitable common cover plates where wiring devices are grouped.
 - .3 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.
- .4 Dimmer:
 - .1 Mount devices at height as specified in Electrical General Requirements Section.
 - .2 Dimmer switches must be installed with the "most downward" position of slider corresponding to zero light intensity and the "highest" position of slider corresponding to full light intensity.

END OF SECTION

Part 1 General

1.1 PRODUCT DATA

- .1 Submit product data in accordance with Electrical General Requirements Section.

Part 2 Products

2.1 DISCONNECT SWITCHES

- .1 Enclosed manual air break switches must conform to CSA C22.1 No.4 (latest edition).
- .2 non-fusible, horsepower rated disconnect switches, size as indicated.
- .3 Provision for padlocking in off switch position by three locks.
- .4 Mechanically interlocked door to prevent opening when handle in ON position.
- .5 Quick-make, quick-break action.
- .6 ON-OFF switch position indication on switch enclosure cover.

2.2 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Electrical General Requirements Section.
- .2 Indicate name of load controlled on size 4 nameplate.

2.3 ACCEPTABLE MANUFACTURERS

<u>Manufacturer</u>	<u>General Purpose</u>	<u>Weather Proof</u>
Cutler Hammer	IHD Series	3HD Series
Schneider Electric	Type A Series	Type R Series
Siemens	ID Series	NFR/FR Series
GE Industrial	TH Series	TH Series

Part 3 Execution

3.1 INSTALLATION

- .1 Install disconnect switches complete with fuses if applicable.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
 - .1 ANSI/IEEE C62.41- 1991, Recommended Practices for Surge Voltages in Low-Voltage AC Power Circuits.
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM F1137- 88 (1993), Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
- .3 United States of America, Federal Communications Commission (FCC)
 - .1 FCC (CFR47) EM and RF Interference Suppression.
- .4 IESNA LM-79-08, IES Electrical Method for the Electrical and Photometric Measurements of Solid State Lighting Products.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings in accordance with Electrical General Requirements Section for all light fixtures supplied under this contract.
- .2 Submit complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by Consultant.
- .3 Photometric data to include: VCP Table spacing criterion.

1.3 SCOPE

- .1 This contractor is responsible to supply and install all lighting fixtures as scheduled and/or indicated including lamp and those accessories required for a complete lighting system. This contractor must coordinate lighting installations with all other Divisions of this project.
- .2 All fixtures must be CSA approved or approved at this contractor's expense by the Special Inspection Division of the Electrical Safety Authority.

1.4 GUARANTEE

- .1 Guarantees for materials replacement shall be as follows from date of substantial completion.
 - .1 LED fixtures, and driver: 5 years.
- .2 The labour required to replace these drivers must be included in the above guarantee, however only for the extent of the contract guarantee and warranty period as noted in Electrical General Requirements.

Part 2 Products

2.1 FIXTURE CONSTRUCTION

- .1 Fixtures must be constructed of 20 gauge (minimum) cold rolled steel. All metal edges require smooth finish.
- .2 Light leaks must be prevented by providing gasketting, stops, and barriers.
- .3 Fixtures must be finished in high reflective baked white enamel. This surface must have a reflectance of not less than 85%.

2.2 FIXTURE LENS

- .1 Unless otherwise noted fixture lenses shall be as follows:
 - .1 Lens thickness: 3.2 mm (1/8")
 - .2 Material: injection moulded clear prismatic virgin acrylic
 - .3 Frame: hinged, latched, steel.

2.3 LED FIXTURES

- .1 Fixture LED's must be tested in conformance with IESNA LM80 standard.
- .2 LED's must be selected using a binning algorithm to ensure colour and lumen output of a given fixture are consistent, as well as meet or surpass ANSI C78.377 specification for the rated lifetime of the fixture. Colour accuracy between products must be within a 2-step MacAdam ellipse.
- .3 Luminaires must be tested to IESNA LM79 by an independent approved laboratory.
- .4 Luminaires must be tested prior to shipping.
- .5 Luminaires must be ULC certified and approved for use in Canada.
- .6 Fixtures must maintain a minimum of 90% of their initial light output for 60,000 hours. Submit test results upon request.
- .7 Lumen values indicated for fixtures in the project documents are to be considered as "absolute" or "delivered" values.
- .8 Other than for specialty fixtures, and unless otherwise indicated, the maximum driver current is to be 750 mA.

2.4 STANDARD EXIT LIGHTING UNITS

- .1 Exit lighting units must conform to CSA C860, CSA 22.2 No. 141 (latest edition).
- .2 Housing: extruded aluminum housing, white finish.
- .3 Face and back plates: extruded aluminum.
- .4 Lamps: 2W LED.
- .5 Operation: 25 year.
- .6 Units are to be provided with three (3) pictogram legends indicating "left from here", "straight from here", and "right from here".
- .7 Face plate to remain captive for relamping.

2.5 EMERGENCY LIGHTING UNITS

- .1 Emergency lighting units must conform to CSA C22.2 No 141 (latest edition).
- .2 Supply voltage: as noted on drawings.
- .3 Output voltage: 12 V DC.
- .4 Battery: sealed, maintenance free, 10 year life.

Note: Battery units must be capable of supplying the wattage indicated for a minimum of 30 minutes.
- .5 Charger: solid state, multi rate, voltage/current regulated, inverse temperature compensated, short circuit protected with regulated output of plus or minus 0.01 V for plus or minus 10% input variations.
- .6 Solid state transfer circuit.
- .7 Low voltage disconnect: solid state, modular, operates at 80% battery output voltage.
- .8 Signal lights: "AC Power ON" condition and "charging" condition.
- .9 Lamp heads: integral on unit, 345° horizontal and 180° vertical adjustment. Lamp type: minimum 4 watt LED.
- .10 Cabinet suitable for direct or shelf mounting to wall and complete with knockouts for conduit. Removable or hinged front panel for easy access to batteries.
- .11 Auxiliary equipment:
 - .1 Test switch.
 - .2 Ac input and DC output terminal blocks inside cabinet.
 - .3 Shelf.
 - .4 Cord and plug connection for AC.

2.6 REMOTE EMERGENCY LIGHTING FIXTURES

- .1 Remote emergency lighting fixtures must conform to CSA C22.2 No141 (latest edition).
- .2 Fixtures shall be small "micro" size or recessed style as indicated in the Light Fixture Schedule.
- .3 Fixtures must be adjustable type heads with canopy.
- .4 Fixtures are to be provided with protective lexan cube when specified in the Light Fixture Schedule.
- .5 Unless otherwise indicated surface mounted fixtures in washrooms, locker rooms, changerooms, and gymnasiums must be provided with wire guard.

2.7 ACCEPTABLE LIGHTING MANUFACTURERS

- .1 Refer to the light fixture schedule as indicated on drawings.

Part 3 Execution

3.1 INSTALLATION

- .1 Locate and install luminaires as indicated. Luminaires are not to be supported from the roof deck. Provide additional unistrut support channel and/or support from structure. Co-ordinate with consultant on site.
- .2 Ball align hangers must be provided for rod suspended fixtures.
- .3 Fixtures surface mounted to suspended ceilings must be secured through ceiling assembly to cross member supports. These supports are to be steel channels or angles independently secured **to structure** using # 12 "jack" chain. Each chain must be secured so no fixture weight is added to the ceiling assembly.
- .4 Plaster frames/flange kits must be provided by this Division for fixtures recessed in plaster and/or drywall ceilings.
- .5 Where specified, fixtures to be chain hung shall be hung using "jack" chain with a capacity to suit the fixture weight. Branch circuit wiring feeding these fixtures shall be AC90 cable "ty-wrapped" at 900mm (36") intervals along length of drop. Final appearance must be neat and professional.
- .6 Install exit lighting units with illuminated faces and chevrons/arrows indicating path(s) of exit as indicated. Unless otherwise noted install exit fixtures at 2400 mm (8' 0") above finished floor.
- .7 Install emergency lighting units and associated remote mounted fixtures as indicated.
- .8 Direct "heads" on units and remote mounted fixtures to illuminate path(s) of exit.
- .9 Install emergency lighting units and remote fixtures at 300mm (12") below finished ceiling, unless indicated otherwise.
- .10 Provide a 15 A 120 V duplex receptacle (connected to circuit indicated) adjacent to unit.
- .11 **Special installation: Secure fixtures to structure to conform to the Electrical Safety Code using "jack chain" NOT ceiling suspension wire. Where coreslab is used, suspension point must be independent of the one used for suspension of the ceiling assembly. As an alternate to jack chain the contractor may use a pre-manufactured aircraft cable suspension and fastening system as manufactured by Gripple (Gripple Cat. #HF02-10F2). Provide minimum 2 per fixture.**
- .12 All battery units are to be provided with a visible lamicoid label indicating the unit number as per drawings.

3.2 WIRING

- .1 Connect luminaires to lighting circuits as indicated.
- .2 Connect exit fixtures to exit lighting circuits and unit equipment (if applicable).
- .3 Connect unit equipment to circuits as indicated.
- .4 All wiring of remote emergency fixtures shall be minimum #10 T90 for each circuit and run in conduit. Wiring must be sized in conformance with manufacturer's recommendations for distances required.

3.3 LUMINAIRE ALIGNMENT

- .1 Align luminaires mounted in continuous rows to form straight uninterrupted line.
- .2 Align luminaires mounted individually parallel or perpendicular to building grid lines.

3.4 DELIVERIES

- .1 Fixtures are to be completely assembled at the manufacturer's plant and delivered to the project site in original unitized containers. Ensure that a dry, protected and secure space is available for proper storage before scheduling delivery of fixtures.

3.5 TESTING/CERTIFICATION

- .1 At the completion of the project and in the presence of the consultant, test all exit and emergency fixtures. On company letterhead, the contractor is to prepare a chart indicating:
 - .1 project
 - .2 date
 - .3 equipment type
 - .4 certification of correct connection
 - .5 certification of correct operation
 - .6 duration of test in minutes (minimum 30)
 - .7 actual period of testing (time of day)

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE).
- .2 Underwriter Laboratories of Canada (ULC).
- .3 International Electrotechnical Commission.
- .4 International Organization for Standardization (ISO).
- .5 National Electrical Manufacturers Association (NEMA).

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings in accordance with Section 26 01 16.
- .2 Submit composite wiring diagrams and control schedule for each room control circuit type as proposed to be installed. Include load type, sequence of operation, sensor parameters, time delays, sensitivities and daylighting set points.
- .3 Catalog cut sheets with performance specifications demonstrating compliance with specified requirements.

1.3 SCOPE

- .1 This contractor is responsible to supply and install all equipment and control wiring as specified for the digital occupancy and daylight control systems. This contractor must coordinate these control systems with the lighting fixtures being supplied for the project to ensure intended function as specified.
- .2 Control Intent: Control Intent includes, but is not limited to:
 - .1 Defaults and initial calibration settings for such items as time delay, sensitivity, fade rates, etc.
 - .2 Initial sensor and switching zones
- .3 All equipment must be CSA approved or approved at this contractor's expense by the Special Inspection Division of the Electrical Safety Authority.
- .4 Reference section 26 51 13 for Lighting information.
- .5 Reference section 26 05 75 for line voltage occupancy sensors and switches (hard wired analog).

1.4 SYSTEM DESCRIPTION AND OPERATION

- .1 The Digital Lighting Control (room level) as defined under this section covers the following equipment:
 - .1 Digital Room Controllers – Self-configuring, digitally addressable one, two or three relays controllers.
 - .2 Digital Occupancy Sensors – Self-configuring, digitally addressable and calibrated occupancy sensors with LCD display and two-way active infrared (IR) communications.
 - .3 Digital Switches – Self-configuring, digitally addressable pushbutton switches, dimmers, and scene switches with two-way active infrared (IR) communications.
 - .4 Configuration Tools – Handheld remote for room configuration provides two way infrared (IR) communications to digital devices and allows complete configuration and reconfiguration of the device / room from an accessible location.

1.5 LIGHTING CONTROL APPLICATIONS

- .1 Provide a minimum application of intended lighting control functions as detailed on design drawings and specified herein. Control functions shall include the following:
 - .1 Space Control Requirements – Provide occupancy/vacancy sensors with Manual-ON functionality in all spaces except toilet rooms, storerooms, or other applications where hands-free operation is desirable and Automatic-ON occupancy sensors are more appropriate. For spaces with multiple occupants, or where line-of-sight may be obscured, provide ceiling- or corner-mounted sensors.
 - .2 Bi-Level Lighting – Provide single zone, multi-level controls in any enclosed office, conference room, meeting room, and training room in all enclosed spaces except where variable dimming or multi-zone switching is used.

1.6 WARRANTY

- .1 Provide a five year complete manufacturer's warranty on all products to be free of manufacturers' defects.
- .2 The labour required to replace these products must be included in the above warranty, however only for the extent of the contract guarantee and warranty period as noted in Electrical General Requirements.

1.7 QUALITY ASSURANCE

- .1 Manufacturer: Minimum 10years experience in manufacture of lighting controls.

Part 2 Products

2.1 MANUFACTURERS

- .1 Basis of design product: Acuity Controls (nlight). No Alternates.

2.2 DIGITAL WALL OR CEILING MOUNTED OCCUPANCY SENSOR SYSTEM

- .1 Wall or ceiling mounted (to suit installation) passive infrared (PIR), ultrasonic or dual technology digital (passive infrared and ultrasonic) occupancy sensor. Furnish the Company's system which accommodates the square-foot coverage requirements for each area controlled, utilizing room controllers, digital occupancy sensors and accessories which suit the lighting and electrical system parameters.
- .2 Digital Occupancy Sensors shall provide calibration and electronic documentation for the following features:
 - .1 Digital calibration and pushbutton programming for the following variables:
 - .1 Sensitivity – 0-100% in 10% increments
 - .2 Time delay – 1-30 minutes in 1 minute increments
 - .3 Test mode – Five second time delay
 - .4 Detection technology – PIR, Ultrasonic or Dual Technology activation and/or re-activation.
 - .5 Walk-through mode
 - .6 Load parameters including Auto/Manual-ON, blink warning, and daylight enable/disable when photosensors are included in the DLM local network.
 - .2 Two-way infrared (IR) transceiver to allow remote programming through handheld commissioning tool and control by remote personal controls.
 - .3 Device Status LEDs including:
 - .1 PIR Detection
 - .2 Ultrasonic detection
 - .3 Configuration mode
 - .4 Load binding
 - .4 Manual override of controlled loads.
 - .5 One or two RJ-45 port(s) for connection to DLM local network.
- .3 Multiple occupancy sensors may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration will be required.

2.3 DIGITAL WALL SWITCHES

- .1 Low voltage momentary pushbutton switches in 1, 2, 3, 4, 5 and 8 button configuration; colour per architect, compatible with wall plates with decorator opening. Wall switches shall include the following features:
 - .1 Two-way infrared (IR) transceiver for use with personal and configuration

-
- remote controls.
 - .2 Removable buttons for field replacement with engraved buttons and/or alternate color buttons. Button replacement may be completed without removing the switch from the wall.
 - .2 Multiple digital wall switches may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration will be required to achieve multi-way switching.
 - .3 The following switch attributes may be changed or selected using a wireless configuration tool:
 - .1 Load and Scene button function may be reconfigured for individual buttons (from Load to Scene, and vice versa).
 - .2 Individual button function may be configured to Toggle, On only or Off only.
 - .3 Individual scenes may be locked to prevent unauthorized change.
 - .4 Switch buttons may be bound to any load on a room controller and are not load type dependent; each button may be bound to multiple loads.
 - .4 Two RJ-45 ports for connection to DLM local network.
 - .5 Multiple digital wall switches may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration will be required to achieve multi-way switching.

2.4 DIGITAL POWER PACKS (ROOM CONTROLLERS)

- .1 Room Controllers automatically bind the room loads to the connected devices in the space without commissioning or the use of any tools. Room Controllers shall be provided to match the room lighting load and control requirements. The controllers will be simple to install and will not have, dip switches, potentiometers or require special configuration. The control units will include the following features:
 - .1 Automatic room configuration to the most energy-efficient sequence of operation based upon the devices in the room.
 - .2 Simple replacement – Using the default automatic configuration capabilities, a room controller may be replaced with an off-the-shelf unit without requiring any configuration or setup.
 - .3 Device Status LEDs to indicate:
 - .1 Data transmission
 - .2 Device has power
 - .3 Status for each load
 - .4 Configuration status
 - .4 Quick installation features including:
 - .1 Standard junction box mounting
 - .5 Plenum rated
 - .6 Manual override and LED indication for each load
 - .7 120 VAC, 60 Hz operation.
 - .8 Zero cross circuitry for each load.
- .2 On/Off Room Controllers shall include:
 - .1 One or multiple relay configuration to suit control details
 - .2 Efficient 150 mA switching power supply
 - .3 Sufficient sensor connection points to suit indicated function without the requirement for additional hardware
 - .4 Discrete model listed for connection to receptacles, for schedule-based control of plug loads within the space.
 - .1 One relay configuration only.
 - .2 Automatic-ON/OFF configuration.
 - .3 Optional Network Bridge for BACnet MS/TP communications
 - .5 Three RJ-45 DLM local network ports.
- .3 On/Off Room/Dimming enhanced Room Controllers shall include:
 - .1 One or multiple relay configuration to suit control details.
 - .2 Efficient 250 mA switching power supply.
 - .3 One 0-10 volt analog output per relay for control of compatible ballasts and LED drivers.

- .4 The following dimming attributes may be changed or selected using a wireless configuration tool:
 - .1 Establish preset level for each load from 0-100%.
 - .2 Set high and low trim for each load.
 - .3 Set lamp burn in time for each load up to 100 hours.
- .5 Four RJ-45 DLM local network ports.
- .6 Optional Network Bridge for BACnet MS/TP communications.

2.5 DIGITAL ROOM CONTROL SYSTEMS

- .1 Digital occupancy and daylight control system designed to control a small area of a building (room level). Digital devices connect to the room controller(s) using CAT 5e cables (LMRJ) with RJ-45 connectors which provide both data and power to room devices. Features of the system shall include:
 - .1 Plug n' Go automatic configuration and binding of occupancy sensors, switches and lighting loads to the most energy-efficient sequence of operation based upon the device attached.
 - .2 Simple replacement of any device in the system with a standard off the shelf unit without requiring commissioning, configuration or setup.
 - .3 Push n' Learn configuration to change the automatic configuration, including binding and load parameters without tools, using only the buttons on the digital devices which are part of the local system.
 - .4 Two-way infrared communications for control by handheld remotes, and configuration by a handheld tool including adjusting load parameters, sensor configuration and binding, within a line of sight of up to 30 feet from a sensor, wall switch or IR receiver.

2.6 CONFIGURATIONS TOOLS

- .1 A configuration tool facilitates optional customization of digital lighting control system featuring infrared communications.
- .2 Features and functionality of the wireless configuration tool shall include:
 - .1 Two-way infrared (IR) communication with DLM IR-enabled devices within a range of approximately 30 feet.
 - .2 Read, modify and send parameters for occupancy sensors, daylighting sensors, room controllers and buttons on digital wall switches.
 - .3 Save up to nine occupancy sensor setting profiles, and apply profiles to selected sensors.

2.7 NETWORK BRIDGE

- .1 Network bridge module connects a DLM local network to a BACnet-compliant segment network for communication between rooms, relay panels and a segment manager or BAS. Each local network shall include a network bridge component to provide a connection to the local network room devices. Network bridge shall use industry standard BACnet MS/TP network communication and an optically isolated EIA/TIA RS-485 transceiver.
 - .1 Network bridge shall be provided as a separate module connected on the local network through an available RJ-45 port.
 - .2 Provide Plug n' Go operation to automatically discover room devices connected to the local network and make all device parameters visible to the segment manager via the segment network. No commissioning shall be required for set up of the network bridge on the local network.
 - .3 Network bridge shall automatically create standard BACnet objects for selected DLM devices to allow any BACnet-compliant BAS to include lighting control and power monitoring features as provided by the DLM devices on each local network. BACnet objects will be created for the addition or replacement of any given DLM device for the installed life of the system. Products requiring that an application-specific point database be loaded to create or map BACnet objects are not acceptable. Systems not capable of providing BACnet data for control devices via a dedicated BACnet Device ID and physical MS/TP termination per room are not acceptable. Standard BACnet objects shall be provided as follows:
 - .1 Read/write the normal or after hours schedule state for the room
 - .2 Read the detection state of each occupancy sensor
 - .3 Read the aggregate occupancy state of the room
 - .4 Read/write the On/Off state of loads
 - .5 Read/write the dimmed light level of loads
 - .6 Read the button states of switches
 - .7 Read total current in amps, and total power in watts through the load controller
 - .8 Read/write occupancy sensor time delay, PIR sensitivity and ultrasonic sensitivity settings
 - .9 Activate a preset scene for the room
 - .10 Read/write daylight sensor fade time and day and night setpoints
 - .11 Read the current light level, in foot-candles, from interior and exterior photosensors and photocells
 - .12 Set daylight sensor operating mode
 - .13 Read/write wall switch lock status
 - .14 Read watts per square foot for the entire controlled room
 - .15 Write maximum light level per load for demand response mode
 - .16 Read/write activation of demand response mode for the room
 - .17 Activate/restore demand response mode for the room

2.8 SEGMENT MANAGER

- .1 For networked applications, the Digital Lighting Management system shall include at least one segment manager to manage network communication. It shall be capable of serving up a graphical user interface via a standard web browser utilizing either unencrypted TCP/IP traffic via a configurable port (default is 80) or 256 bit AES encrypted SSL TCP/IP traffic via a configurable port (default is 443).
- .2 Each segment manager shall have integral support for at least three segment networks. Segment networks may alternately be connected to the segment manger via external BACnet-to-IP interface routers and switches, using standard Ethernet structured wiring. Each router shall accommodate one segment network. Provide the quantity of routers and switches as shown on the Drawings.
- .3 Operational features of the Segment Manager shall include the following:
 - .1 Connection to PC or LAN via standard Ethernet TCP/IP via standard Ethernet TCP/IP with the option to use SSL encrypted connections for all traffic.
 - .2 Easy to learn and use graphical user interface, compatible with Internet Explorer 8, or equal browser. The Segment Manager shall not require installation of any lighting control software on an end-user PC.
 - .3 Log in security capable of restricting some users to view-only or other limited operations.
 - .4 Segment Manager shall provide two main sets of interface screens - those used to initially configure the unit (referred to as the config screens), and a those used to allow users to dynamic monitor the performance of their system, and provide a centralized scheduling interface. Capabilities using the Config Screens shall include:
 - .1 Automatic discovery of DLM devices and relay panels on the segment network(s). Commissioning beyond activation of the discovery function shall not be required to provide communication, monitoring or control of all local networks and lighting control panels.
 - .2 Allow information for all discovered DLM devices to be imported into the Segment Manager via a single XML based site file from the Wattstopper LMCS Software, significantly reducing the time needed to make a system usable by the end user. Importable information can include text descriptions of every DLM component and individual loads, and automatic creation of room location information and overall structure of DLM network. Info entered into LMCS should not have to be re-entered manually via keystrokes into the Segment Manager
 - .3 After discovery, all rooms and panels shall be presented in a standard navigation tree format. Selecting a device from the tree will allow the device settings and operational parameters to be viewed and changed by the user.
 - .4 Ability to view and modify DLM device operational parameters. It shall be possible to set device parameters independently for normal hours and after hours operation including sensor time delays and sensitivities, and load response to sensor including Manual-On or Auto-On.

-
- .5 Provide capabilities for integration with a BAS via BACnet protocol. At a minimum, the following points shall be available to the BAS via BACnet IP connection to the segment manager: room occupancy state; room schedule mode; room switch lock control; individual occupancy sensor state; room lighting power; room plug-load power; load ON/OFF state; load dimming level; panel channel schedule state; panel relay state; and Segment Manager Group schedule state control. Any of above items shall be capable of being moved into an "Export Table" that will provide any integrator with only the data they need, and by using the Export Table effectively create a firewall between the integrator's request for info and the overall system performance.
 - .5 Capabilities using the Segment Manager's Dashboard Screens shall include:
 - .1 A dynamic "tile" based interface that allows easy viewing of each individual room's lighting and plug load power consumption, and lighting and plug load power density (power consumption information requires Enhanced DLM Room and Plug Load Controllers with integral current transducers such as LMRC-21x). Tiles will be automatically organized according to location so a single tile for the building summarizes all information for tiles beneath it on every floor, in every area, in every room. Tiles use three color coded energy target parameters, allowing an owner to quickly identify rooms that are not performing efficiently. Tiles for rooms with occupancy sensors shall include an icon to indicate whether that room is occupied. Tiles shall be clickable, and when clicked the underlying hierarchical level of tiles shall become visible. Tile interface shall be accessible via mouse, or touch screen devices. Tiles shall be created automatically by the segment manager, based on the information found during the device discovery and/or information included in a file imported in from LMCS (such as tagged descriptions for each room) without any custom programming.
 - .2 Ability to set up schedules for DLM local networks (rooms) and panels. Schedules shall be capable of controlling individual rooms with either on/off or normal hours/after hours set controlled zones or areas to either a normal hours or after hours mode of operation. Support for annual schedules, holiday schedules and unique date-bound schedules, as well as astro On or astro Off events with offsets. Schedules shall be viable graphically as time bars in a screen set up to automatically show scheduled events by day, week or month.
 - .6 If shown on the Drawings, Segment Managers shall be integrated into a larger control network by the addition of a Network Supervisor package. The Supervisor is a server level computer running a version of the Segment Manager interface software with dedicated communication and networking capability, able to pull information automatically from each individual Segment Manager in the network. By using a Supervisor, information for individual Segment Managers can be accessed and stored on the Supervisor's hard drive, eliminating the risk of data being overwritten after a few days because of Segment Manager memory limits.

- .7 Segment Manager shall allow access and control of the overall system database via Native Niagara AX FOX connectivity. Systems that must utilize a Tridium Niagara controller in addition to the programming, scheduling and configuration server are not acceptable.
- .4 Segment Manager v2.2 and later shall support multiple DLM rooms as follows:
 - .1 Support up to 120 network bridges and 750 digital in-room devices (LMSM-3E).
 - .2 Support up to 200 network bridges and 1,100 digital in room devices, connected via network routers and switches (LMSM-6E).

2.9 PROGRAMMING, CONFIGURATION AND DOCUMENTATION SOFTWARE

- .1 PC-native application for optional programming of detailed technician-level parameter information for all DLM products, including all parameters not accessible via BACnet and the handled IR configuration tool. Software must be capable of accessing room-level parameter information locally within the room when connected via the optional LMCI-100 USB programming adapter, or globally for many segment networks simultaneously utilizing standard BACnet/IP communication.
- .2 Additional parameters exposed through this method include but are not limited to:
 - .1 Occupancy sensor detection LED disable for performance and other aesthetic spaces where blinking LEDs present a distraction.
 - .2 Six occupancy sensor action behaviors for each controlled load, separately configurable for normal hours and after hours modes. Modes include: No Action, Follow Off Only, Follow On Only, Follow On and Off, Follow On Only with Override Time Delay, Follow Off Only with Blink Warn Grace Time, Follow On and Off with Blink Warn Grace Time.
 - .3 Separate fade time adjustments per load for both normal and after hours from 0 - 4 hours.
 - .4 Configurable occupancy sensor re-trigger grace period from 0 - 4 minutes separate for both normal hours and after hours.
 - .5 Separate normal hours and after hours per-load button mode with modes including: Do nothing, on only, off only, on and off.
 - .6 Load control polarity reversal so that on events turn loads off and vice versa.
 - .7 Per-load DR (demand response) shed level in units of percent.
 - .8 Load output pulse mode in increments of 1second.
 - .9 Fade trip point for each load for normal hours and after hours that establishes the dimmer command level at which a switched load closes its relay to allow for staggered On of switched loads in response to a dimmer.

- .3 Generation of reports at the whole file, partial file, or room level. Reports include but are not limited to:
 - .1 Device list report: All devices in a project listed by type.
 - .2 Load binding report: All load controller bindings showing interaction with sensors, switches, and daylighting.
 - .3 BACnet points report: Per room Device ID report of the valid BACnet points for a given site's BOM.
 - .4 Room summary report: Device manifest for each room, aggregated by common BOM, showing basic sequence of operations.
 - .5 Device parameter report: Per-room lists of all configured parameters accessible via hand held IR programmer for use with O&M documentation.
 - .6 Scene report: All project scene pattern values not left at defaults (i.e. 1 = all loads 100 percent, 2 = all loads 75 percent, 3 = all loads 50 percent, 4 = all loads 25 percent, 5-16 = same as scene 1).
 - .7 Occupancy sensor report: Basic settings including time delay and sensitivities for all occupancy sensors.
- .4 Network-wide programming of parameter data in a spreadsheet-like programming environment including but not limited to the following operations:
 - .1 Set, copy/paste an entire project site of sensor time delays.
 - .2 Set, copy/paste an entire project site of sensor sensitivity settings.
 - .3 Search based on room name and text labels.
 - .4 Filter by product type (i.e. LMRC-212) to allow parameter set by product.
 - .5 Filter by parameter value to search for product with specific configurations.
- .5 Network-wide firmware upgrading remotely via the BACnet/IP network.
 - .1 Mass firmware update of entire rooms.
 - .2 Mass firmware update of specifically selected rooms or areas.
 - .3 Mass firmware upgrade of specific products

2.10 DLM SEGMENT NETWORK

- .1 Provide a segment network using linear topology, BACnet-based MS/TP subnet to connect DLM local networks (rooms) and LMCP relay panels for centralized control.
 - .1 Each connected DLM local network shall include a single network bridge (LMBC-300), and the network bridge is the only room-based device that is connected to the segment network.
 - .2 Network bridges, relay panels and segment managers shall include terminal blocks, with provisions for separate "in" and "out" terminations, for segment network connections.
 - .3 Segment network utilizes 1.5 twisted pair, shielded, cable supplied by the lighting control manufacturer. Maximum cable run for each segment is 4,000 feet. Conductor-to-conductor capacitance of the twisted pair shall be less than 30 pf/ft and have a characteristic impedance of 120 Ohms.

- .4 Network wire jacket is available in high visibility green, white, or black.
- .5 Substitution of manufacturer-supplied cable is not permitted and may void the warranty, if non-approved cable is installed, and if terminations are not completed according to manufacturer's specific requirements.
- .6 Network signal integrity requires that each conductor and ground wire be correctly terminated at every connected device.
- .7 Segment networks shall be capable of connecting to any of the following: BACnet-compliant BAS (provided by others) directly via MS/TP, or BACnet/IP via an NB-ROUTER or LMSM Unit. Systems whose room-connected network infrastructure require gateway devices to provide BACnet data to a BAS are unacceptable.

Part 3 Execution

3.1 INSTALLATION

- .1 Install the work of this Section in accordance with manufacturer's printed instructions unless otherwise indicated.
- .2 When using wire for connections other than the DLM local network (LMRJ Cat 5e with RJ-45 connectors), provide detailed point to point wiring diagrams for every termination. Provide wire specifications and wire colors to simplify contactor termination requirements.
- .3 Calibrate all sensor time delays and sensitivity to guarantee proper detection of occupants and energy savings.
 - .1 Adjust time delay so that controlled area remains lighted for 5 minutes after occupant leaves area.
- .4 Install power packs in accessible maintenance areas unless noted otherwise. Provide access doors if power packs are installed above drywall ceilings.
- .5 Install sensors in gym where noted on plan at mid-height of wall.
- .6 It shall be the contractor's responsibility to locate and aim sensors in the correct location required for complete and proper coverage within the range of coverage as per the manufacturer's recommendations. The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only the rooms which are to be provided with sensors. The contractor shall provide additional sensors if required to properly and completely cover the respective rooms.
- .7 Provide written or computer-generated documentation on the commissioning of the system including room by room description including:
 - .1 Sensor parameters, time delays, sensitivities, and daylighting setpoints.
 - .2 Sequence of operation, (e.g. manual ON, Auto OFF. etc.)
 - .3 Load Parameters (e.g. blink warning, etc.)

- .8 Re-commissioning – After 30 days from occupancy re-calibrate all sensor time delays and sensitivities to meet the Owner’s Project Requirements. Provide a detailed report to the Architect / Owner of re-commissioning activity.

3.2 FACTORY COMMISSIONING

- .1 Upon completion of the installation, the system shall be commissioned by the manufacturer's factory authorized representative who will verify a complete fully functional system.
- .2 The electrical contractor shall provide both the manufacturer and the electrical engineer with ten working days written notice of the system startup and adjustment date.
- .3 Upon completion of the system commissioning the factory-authorized technician shall provide the proper training to the owner's personnel on the adjustment and maintenance of the system.
- .4 Factory commissioning shall include functional testing and documentation of the control system conforming to the “Functional Testing” requirements included in the current ASHRAE standard. This cost shall be included in the Tender Price.

END OF SECTION

Building Efficiency
40 Hempstead Drive, Hamilton, ON L8W 2E7, Canada
Tel: (647) 688-0702



February 6, 2025

Subject: HCDSB – Ascension N2 to BACnet

Revision 0

Attn: Josh Duffield, HCDSB

Cc: Luke Shaver, HCDSB

Johnson Controls is pleased to present our proposal for the BAS controls scope for the N2 to BACnet upgrade of Ascension ES.

This project proposal has been created based upon our review of the following:
Johnson Controls As-Built BAS drawings dated 112599
Request for control of CUH/UH's as reflected on 08_ASC_HVAC Equipment Drawings

Proposed scope of work

- Replace NAE with SNE (current generation supervisory controller)
- Provide new BACnet MS/TP communication trunk throughout school
- Convert programming within existing CGM controller (and expansion modules) serving Boilers from N2 to BACnet
- Convert programming within existing CGM controller serving Chiller from N2 to BACnet
- Replace existing UNT controller Gym Rooftop CGM controller
 - Provide new space temperature sensor
- Replace existing UNT controllers serving Unit Vents (22) and Fan Coils (4) with CGM controllers to include for the following points
 - Includes replacement of existing Metastat space sensor with Netstat
- Replace existing UNT controllers serving miscellaneous systems (i.e. hot water radiation, solenoid valves, etc.) with CGM controllers
 - Includes replacement of existing Metastat space sensors with Netstat
- Add control point (enable/disable) and space temperature (flush mount SS sensor) of Cabinet/Unit Heaters (8)
- Programming per existing board standard sequences
- Provide new database, utilizing Metasys User Interface (MUI), including for space and equipment relationships
- All site work to be completed during regular working hours, summer 2025

Building Efficiency
 40 Hempstead Drive, Hamilton, ON L8W 2E7, Canada
 Tel: (647) 688-0702



Exclusions & Clarifications (applies to all sections)

1. Pricing assumes normal working hours, Mon-Fri, 7am to 4pm. Excludes all off-hours work.
2. Excludes furnishing and/or installation of the following **unless noted otherwise in this proposal**;
 - a. Fire Smoke Dampers (FSD), Smoke Control Dampers (SCDs) Fire/Smoke Detectors or associated power and control wiring
 - b. Control Dampers
 - c. Starters, Disconnects or Variable Speed Drives
 - d. Line-Voltage Thermostats, Thermal Switches or Pushbutton Switches
 - e. Lighting Integration or Lighting Controls
 - f. Line voltage power
 - g. Mechanical Equipment
 - h. Access Doors
 - i. Thermometers, Thermowells or Pressure Gauges
 - j. Control Valves
 - k. Airflow Measuring Stations
 - l. Metering Devices
3. Excludes all 120v power to controllers, transformers or any other applicable devices.
4. Excludes any demolition work unless noted otherwise in this proposal.
5. Low voltage cabling will be installed using plenum rated cables without conduit in concealed, accessible locations. Where exposed or subject to damage, EMT conduit will be used. This applies to all control work.
6. Excludes any work or services associated or connected with the identification, abatement, cleanup, control, removal or disposal of hazardous materials or substances, including but not limited to asbestos or PCBs.
7. Start-up and/or verification of factory-installed controls to be provided by others.
8. Excludes Mineral Insulated Cable or work associated with the installation, procurement or wiring of said cable.
9. Excludes Maintenance or troubleshooting not associated with the scope of work described above.
10. Excludes Air or Water test & balancing
11. Work associated with occupancy/motion detector(s)
12. Excludes 3rd Party Commissioning or commissioning assistance unless noted otherwise in this proposal.
13. Excludes liquidated damages.
14. All invoices are net thirty (30) days.
15. **Excludes any and all items not specifically mentioned in the document above.**

Building Efficiency
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PRICING SUMMARY (HST Extra, Net 30 days)

DESCRIPTION	Total Price
Item A: Building Automation System	CAD \$ 124,578.00

* Price includes estimated state and local taxes on material but excludes change orders. Any additional taxes, duties, tariffs or similar items imposed prior to shipment will be charged.

Signatures

This proposal is hereby accepted, and Johnson Controls is authorized to proceed with the work, subject however, to credit approval by Johnson Controls.

Pricing is valid for 30 days from the date of this proposal.

Signature

Company: _____
 Name: _____
 PO #: _____
 Date: _____

Signature

Name: Iain Hill
 Phone: (647) 688-0702
 Email: Iain.d.hill@jci.com

CUSTOMER ACCEPTANCE:

In accepting this Agreement, Customer agrees to the terms and conditions contained herein including those on the following page(s) of this Agreement and any attachments or riders attached hereto that contain additional terms and conditions. It is understood that these terms and conditions shall prevail over any variation in terms and conditions on any purchase order or other document that Customer may issue. Any changes requested by Customer after the execution of this Agreement shall be paid for by the Customer and such changes shall be authorized in writing. **ATTENTION IS DIRECTED TO THE LIMITATION OF LIABILITY, WARRANTY, INDEMNITY AND OTHER CONDITIONS CONTAINED IN THIS AGREEMENT.**

Customer agrees to pay Johnson Controls pursuant to the progress-based billing schedule of values below. If the schedule of values includes an upfront deposit, it will be paid within 30 days of contract signing and Johnson Controls will not commence work until the upfront deposit is received. Customer agrees to pay for materials, goods, and equipment (ordered, delivered, or stored) pursuant to the schedule of values, prior to installation commencement. The remaining portion of the total price will be progress billed through completion of the work. Johnson Controls progress-based billing can also include any services performed on-site or off-site. All invoices will be delivered via email, paid via ACH/EFT bank transfer and are due NET 30 days from the date of the invoice. ACH/EFT bank transfer details will be provided upon contract execution. The proposed total price is contingent on Customer agreeing to these payment and invoicing terms

Planned Monthly Progress Billing Schedule of Values		
Item #	Description	%
1	Mobilization	20
2	Design/Engineering	TBD
3	Materials/Goods/Equipment	TBD
4	Installation	TBD
5	Commissioning	TBD
*To be mutually agreed upon in writing at a later date		

This offer shall be void if not accepted in writing within thirty (30) days from the date first set forth above.

To ensure that JCI is compliant with your company's billing requirements, please provide the following information:

PO is required to facilitate billing:

No: This signed contract satisfies requirement Yes: Please reference this PO Number _____

AR Invoices are accepted via e-mail: YES: E-mail address to be used: _____

NO: Please submit invoices via mail

NO: Please submit via _____

Deposit / Mobilization Invoice accepted (____%)

No: Yes:

Standard Terms and Conditions – Canada

References to “products”, “equipment” or “services” herein shall mean those to be furnished by Seller as identified on the applicable Seller Quotation

(1) **AGREEMENT AND LIMITATIONS.** Buyer accepts these Standard Terms and Conditions by signing and returning Seller’s Quotation, by sending a purchase order in response to the Quotation, or Buyer’s instructions to Seller to begin work, including shipment of product or performance of services. Upon Buyer’s acceptance, Seller’s Quotation and the related terms and conditions referred to in the Quotation shall constitute the entire agreement relating to the products, equipment and services covered by the Quotation (the “Agreement”). No terms, conditions or warranties other than those identified in the Quotation and no agreement or understanding, oral or written, in any way purporting to modify such terms and conditions whether contained in Buyer’s purchase order or shipping release forms, or elsewhere, shall be binding on Seller unless hereafter made in writing and signed by Seller’s authorized representative. Buyer is hereby notified of Seller’s express rejection of any terms inconsistent with these Standard Terms and Conditions or to any other terms proposed by Buyer in accepting Seller’s Quotation. Neither Seller’s subsequent lack of objection to any such terms, nor the delivery of the products or services, shall constitute an agreement by Seller to any such terms.

(2) **TERMINATION OR MODIFICATION.** If either party materially breaches this agreement, the other party may notify the breaching party in writing, setting out the breach, and the breaching party will have 60 days following such notice to remedy the breach. If the breaching party fails to remedy the breach during that period, the other party may by written notice terminate the Agreement. These Standard Terms and Conditions may be modified or rescinded only by a writing signed by authorized representatives of both Seller and Buyer. Accepted orders may be cancelled or modified by Buyer only with Seller’s express written consent. If cancellation or modification is allowed, Buyer agrees to pay to Seller all expenses incurred and damage sustained by Seller on account of such cancellation or modification, plus a reasonable profit.

(3) **PRICE, SHIPMENT, AND PAYMENT.** Prices in any quotation or proposal from Seller are subject to change upon notice sent to Buyer at any time before the quotation or proposal has been accepted. Price and delivery is F.O.B. point of manufacture, unless otherwise provided. Unless otherwise agreed to in writing by Seller, all payments are due net thirty (30) days from the date of invoice. Seller may, at its sole option, have the right to make any delivery under this Agreement payable on a cash or payment guarantee before shipment basis. In the case of export sales, unless otherwise agreed to in writing by Seller, all payments are to be made by means of a confirmed irrevocable letter of credit. Invoicing disputes must be identified in writing within 21 days of the date of invoice. Payments of any disputed amounts are due and payable upon resolution. All other amounts remain due within 30 days. In the event of Buyer’s default, the balance of any outstanding amounts will be immediately due and payable. Failure to make payments when due will give Seller, without prejudice to any other right or remedy, the right to: (i) stop performing any services, withhold deliveries of equipment and other materials, terminate or suspend any unpaid software licenses, and/or terminate this Agreement; and (ii) charge Buyer interest on the amounts unpaid at a rate equal to the lesser of one and one half (1.5) percent per month or the maximum rate permitted under applicable law, until payment is made in full. Shipments to Buyer with outstanding invoices unpaid after thirty (30) days will be suspended until all overdue invoices are paid or be made on a cash-in-advance basis only, in Seller’s sole discretion.

(4) **TAXES.** All prices exclude state/provincial and local use, sales or similar taxes. Such taxes, if applicable, will appear as separate items on the invoice unless Buyer provides a tax exemption certificate that is acceptable to taxing authorities. Pricing for products and parts covered by this quotation, proposal and/or Agreement does not include any amounts for changes in taxes, tariffs, duties or other similar charges imposed and/or enacted by a government. At any time prior to shipment, Seller shall be entitled to an increase in time and money for any costs that it incurs directly or indirectly that arise out of or relate to changes in taxes, tariffs, duties or similar charges due to such changes.

(5) **DELIVERY.** The delivery date(s) provided by Seller for the product and equipment is only an estimate and is based upon prompt receipt of all necessary information from Buyer. The delivery date(s) is subject to and shall be extended

by delays caused by acts of God, severe weather (including but not limited to hurricanes, tornados, severe snowstorms or severe rainstorms), wildfires, floods, earthquakes, seismic disturbances, or other natural disasters, acts or omissions of any governmental authority (including change of any applicable law or regulation), epidemics, pandemics, disease, viruses, quarantines, or other public health risks and/or responses thereto, condemnation, strikes, lock-outs, labor disputes, fires, explosions or other casualties, thefts, vandalism, civil disturbances, insurrection, mob violence, riots, war or other armed conflict (or the serious threat of same), acts of terrorism, electrical power outages, interruptions or degradations in telecommunications, computer, network, or electronic communications systems, data breach, cyber-attacks, ransomware, unavailability or shortage of parts, materials, supplies, or transportation, or any other cause or casualty beyond the reasonable control of Seller, whether foreseeable or unforeseeable. FAILURE TO DELIVER WITHIN THE TIME ESTIMATED SHALL NOT BE A MATERIAL BREACH OF CONTRACT ON SELLER’S PART. If Buyer causes Seller to delay shipment or completion of the product or equipment, Seller shall be entitled to any and all extra cost and expenses resulting from such delay.

(6) **LIMITED WARRANTY.** Seller warrants that the product and equipment furnished by Seller under the Agreement will be of good quality and that the services provided by Seller will be provided in a good and workmanlike manner. If Seller installs or furnishes product or equipment under the Agreement, and such product or equipment, or any part thereof, is covered by a manufacturer’s warranty, Seller will transfer the benefits of that manufacturer’s warranty to Buyer. This limited warranty does not cover failures caused in whole or in part by (i) improper installation or maintenance performed by anyone other than Seller; (ii) improper use or application; (iii) corrosion; (iv) normal deterioration; (v) operation beyond rated capacity, (vi) the use of replacement parts or lubricants which do not meet or exceed Seller’s specifications, or (vii) if Seller’s serial numbers or warranty date decals have been removed or altered. To qualify for warranty consideration for products or equipment, at the earlier of the Buyer’s discovery of the defect or the time at which the Buyer should have discovered the defect; Buyer must immediately notify Seller in writing for instructions on warranty procedures. Seller’s sole obligation for defective services shall be to repair or to replace defective parts or to properly redo defective services. All replaced equipment becomes Seller’s property. **THIS WARRANTY IS EXCLUSIVE AND IS PROVIDED IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. SELLER MAKES NO AND SPECIFICALLY DISCLAIMS ALL REPRESENTATIONS OR WARRANTIES THAT THE SERVICES, PRODUCTS, SOFTWARE OR THIRD PARTY PRODUCT OR SOFTWARE WILL BE SECURE FROM CYBER THREATS, HACKING OR OTHER SIMILAR MALICIOUS ACTIVITY.**

(7) **INDEMNIFICATION, REMEDIES AND LIMITATIONS OF LIABILITY.** In addition to Paragraph 8 below regarding patents, Buyer agrees that Seller shall be responsible only for such injury, loss, or damage caused by the intentional misconduct or the negligent act or omission of Seller. In the event Buyer claims Seller has breached any of its obligations, whether of warranty or otherwise, Seller may request the return of the goods and tender to Buyer the purchase price theretofore paid by Buyer, and in such event, Seller shall have no further obligation under the Agreement except to refund such purchase price upon redelivery of the goods. If Seller so requests the return of the goods, the goods shall be redelivered to Seller in accordance with Seller’s instructions and at Seller’s expense. The remedies contained in these Standard Terms and Conditions shall constitute the sole recourse of Buyer against Seller for breach of any of Seller’s obligations under the Agreement, whether of warranty or otherwise. **To the maximum extent permitted by law, in no event shall Seller be liable for to Buyer or any third party under any cause of action or theory of liability even if advised of the possibility of such damages, for any: (a) special, indirect, incidental, punitive, or consequential damages of any nature; (b) loss of data or other losses arising from viruses, ransomware, cyber-attacks or failures or interruptions to network systems; (c) loss of anticipated profit,**

loss of revenues, loss of business opportunity, anticipated savings, goodwill, or other economic loss, (d) business interruption, or (d) for any damages arising in tort, whether by reason of breach of warranty, contract, strict liability, negligence, of from an tortious act or omission of Seller or its employees, or otherwise, regardless of whether Seller has been apprised of the possibility of such. In any case, the entire aggregate liability of the JCI Parties under this agreement for all damages, losses, and causes of action (whether in contract, tort (including negligence), or otherwise) shall be limited to the amounts paid by Buyer during the 12-month period immediately preceding the event giving rise to the claim or where the time and material payment term is selected.

(1) **PATENTS.** Seller shall indemnify, defend, or at its option settle, and hold Buyer and its directors, officers, employees, agents, subsidiaries, affiliates, subcontractors and assignees, harmless from and against any and all claims, suits, actions or proceeds ("Claims") against such parties based upon the infringement or alleged infringement, or violation or alleged violation, of (a) any Canadian patent and (b) any copyright, trademark, trade secret or other proprietary right of a third party which is enforceable in Canada, as a result of Buyer's use of the product or equipment within the Canada, provided that: (i) Buyer gives Seller prompt written notice of any such Claim, (ii) Buyer gives Seller full authority to defend or settle any such Claim, and (iii) Buyer gives Seller proper and full information and assistance, at Seller's expense (except for Buyer's employees' time) to defend or settle any such Claim. THE FOREGOING IS IN LIEU OF ANY WARRANTIES OF NONINFRINGEMENT, WHICH ARE HEREBY DISCLAIMED. The foregoing obligation of Seller does not apply with respect to products or equipment or portions or components thereof (a) not supplied by Seller, (b) made in whole or in part in accordance with Buyer or owner specifications, (c) which are modified after shipment by Seller, if the alleged infringement related to such modification, (d) combined with other products, processes or materials where the alleged infringement relates to such combination, (e) where Buyer continues allegedly infringing activity after being notified thereof and/or after being informed of modifications that would have avoided the alleged infringement without significant loss of performance or functionality, or (f) where Buyer's use of the product or equipment is incident to an infringement not resulting primarily from the product or equipment; Buyer will indemnify Seller and its officers, directors, agents, and employees from all damages, settlements, attorneys' fees and expenses related to a claim of infringement, misappropriation, defamation, violation of rights of publicity or privacy excluded from Seller's indemnity obligation herein.

(2) **GOVERNING LAW AND ONE-YEAR LIMITATION.** This Agreement shall be governed by and be construed in accordance with the laws of Ontario. The parties agree that any disputes arising under this Agreement shall be determined exclusively by the Ontario courts and that no action or legal proceedings of any nature shall be filed or commenced in any other court pertaining to any dispute arising out of or in relation to this Agreement. The parties also hereby waive any objection to the exclusive jurisdiction of the Ontario courts, including any objection based on forum non conveniens. No claim or cause of action, whether known or unknown, shall be brought against Johnson Controls more than one year after the claim first arose. Except as provided for herein, Johnson Controls' claims must also be brought within one year. Claims not subject to the one-year limitation include claims for unpaid: (1) contract amounts, (2) change order amounts (approved or requested) and (3) delays and/or work inefficiencies.

(3) **DISPUTE RESOLUTION.** Seller shall have the sole and exclusive right to determine whether any dispute, controversy or claim arising out of or relating to the Agreement, or the breach thereof, shall be submitted to a court of law or arbitrated. The venue for any such arbitration shall be in Ontario, Canada. The arbitrator's award may be confirmed and reduced to judgment in any court of competent jurisdiction. In the event the matter is submitted to a court, Seller and Buyer hereby agree to waive their right to trial by jury and covenant that neither of them will request trial by jury in any such litigation. Buyer will pay all of Seller's reasonable collection costs (including legal fees and expenses).

(4) **SOFTWARE AND DIGITAL SERVICES.** Use, implementation, and deployment of the software and hosted software products ("Software") offered under these terms shall be subject to, and governed by, Seller's standard terms for such Software and Software related professional services in effect from time to time at <https://www.johnsoncontrols.com/techterms> (collectively, the "Software Terms"). Applicable Software Terms are incorporated herein by this reference.

Other than the right to use the Software as set forth in the Software Terms, Seller and its licensors reserve all right, title, and interest (including all intellectual property rights) in and to the Software and improvements to the Software. The Software that is licensed hereunder is licensed subject to the Software Terms and not sold. If there is a conflict between the other terms herein and the Software Terms, the Software Terms shall take precedence and govern with respect to rights and responsibilities relating to the Software, its implementation and deployment and any improvements thereto.

(5) **CONNECTED EQUIPMENT SERVICES.** Certain equipment sold hereunder includes by default Seller's Connected Equipment Services. Connected Equipment Services is a data-analytics and monitoring Software platform that uses a cellular or network connection to gather equipment performance data to assist Seller in advising Buyer on (and Buyer in better understanding) such equipment's health, performance or potential malfunction. **If Buyer's equipment includes Connected Equipment Services, such services will be on by default and the remote connection will continue to connect to Buyer's Equipment through the full equipment lifecycle, unless Buyer specifically requests in writing that Seller disable the remote connection or Seller discontinues or removes such remote connection.** For more information on whether your particular equipment includes Connected Equipment Services, a subscription to such services and the cost, if any, of such subscription, please see your applicable order, quote, proposal, or purchase documentation or talk to your Seller sales representative. If Buyer's equipment includes Connected Equipment Services, Seller will provide a cellular modem or other gateway device ("Gateway Device") owned by Seller or Buyer will supply a network connection suitable to establish a remote connection with Buyer's applicable equipment to permit Seller to use Connected Equipment Services to perform first-year and extended warranty services as well as other services, including troubleshooting, quarterly health reports, remote diagnostic and monitoring and aftermarket services. For certain subscriptions, Buyer will be able to access equipment information from a mobile or smart device using Connected Equipment Service's mobile or web app. Any Gateway Devices provided hereunder shall remain Seller's property, and Seller may upon reasonable notice access and remove such Gateway Device and discontinue services in accordance with the Software Terms. If Buyer does not permit Seller to connect via a connection validated by Seller for the equipment and a service representative must therefore be dispatched to the Buyer site, then the Buyer will pay Seller at Seller's then-current standard applicable contract regular time and/or overtime rate for services performed by the service representative. Seller disclaims any obligation to advise Buyer of any possible equipment error or malfunction. **Buyer acknowledges that, while Connected Equipment Services generally improve equipment performance and services, Connected Equipment Services does not prevent all potential malfunction, insure against all loss or guarantee a certain level of performance and that Seller shall not be responsible for any injury, loss, or damage caused by any act or omission of Seller related to or arising from the monitoring of the equipment under Connected Equipment Services.**

(6) **MISCELLANEOUS**

(a) **CHANGES OF CONSTRUCTION AND DESIGN:** Seller reserves the right to change or revise the construction and design of the products or equipment purchased by Buyer, without liability or obligation to incorporate such changes to products or equipment ordered by Buyer unless specifically agreed upon in writing reasonably in advance of the delivery date for such products or equipment. Buyer agrees to bear the expense of meeting any changes or modifications in local code requirements which become effective after Seller has accepted Buyer's order.

(b) **CHARACTER OF PRODUCT AND SECURITY INTEREST:** The goods delivered by Seller under the terms of the Agreement shall remain personal property and retain its character as such no matter in what manner affixed or attached to any structure or property. Buyer grants Seller a security interest in said goods, any replacement parts and any proceeds thereof until all sums due Seller have been paid to it in cash. This security interest shall secure all indebtedness or obligations of whatsoever nature now or hereafter owing Buyer to Seller. Buyer shall pay all expenses of any nature whatsoever incurred by Seller in connection with said security interest.

(c) **INSURANCE:** Buyer agrees to insure the goods delivered under the Agreement in an amount at least equal to the purchase price against loss or

damage from fire, wind, water or other causes. The insurance policies are to be made payable to Seller and Buyer in accordance with their respective interests, and when issued are to be delivered to Seller and held by it. Failure to take out and maintain such insurance shall entitle Seller to declare the entire purchase price to be immediately due and payable and shall also entitle Seller to recover possession of said goods.

(a) **INSTALLATION:** If installation by the Seller is included within the Seller's Quotation, Buyer shall provide all of the following at its own expense and at all times pertinent to the installation: i) free, dry, and reasonable access to Buyer's premises; and ii) proper foundations, lighting, power, water and storage facilities reasonably required.

(b) **COMPLIANCE WITH LAWS:** Seller's obligations are subject to the export administration and control laws and regulations of Canada and the United States. Buyer shall comply fully with such laws and regulation in the export, resale or disposition of purchased products or equipment. Quotations or proposals made, and any orders accepted by Seller from a Buyer outside of Canada are with the understanding that the ultimate destination of the products or equipment is the country indicated therein. Diversion of the products or equipment to any other destination contrary to Canada is prohibited. Accordingly, if the foregoing understanding is incorrect, or if Buyer intends to divert the products or equipment to any other destination, Buyer shall immediately inform Seller of the correct ultimate destination.

(c) **LIEN LEGISLATION.** Notwithstanding anything to the contrary contained herein, the terms of this Agreement shall be subject to the lien legislation applicable to the location where the work will be performed, and, in the event of conflict, the applicable lien legislation shall prevail.

(d) **FORCE MAJEURE.** Seller shall not be liable, nor in breach or default of its obligations under this Agreement, for delays, interruption, failure to render services, or any other failure by Seller to perform an obligation under this Agreement, where such delay, interruption or failure is caused, in whole or in part, directly or indirectly, by a Force Majeure Event. A "Force Majeure Event" is a condition or event that is beyond the reasonable control of Seller, whether foreseeable or unforeseeable, including, without limitation, acts of God, severe weather (including but not limited to hurricanes, tornados, severe snowstorms or severe rainstorms), wildfires, floods, earthquakes, seismic disturbances, or other natural disasters, acts or omissions of any governmental authority (including change of any applicable law or regulation), epidemics, pandemics, disease, viruses, quarantines, or other public health risks and/or responses thereto, condemnation, strikes, lock-outs, labor disputes, an increase of 5% or more in tariffs or other excise taxes for materials to be used on the project, fires, explosions or other casualties, thefts, vandalism, civil disturbances, insurrection, mob violence, riots, war or other armed conflict (or the serious threat of same), acts of terrorism, electrical power outages, interruptions or degradations in telecommunications, computer, network, or electronic communications systems, data breach, cyber-attacks, ransomware, unavailability or shortage of parts, materials, supplies, or transportation, or any other cause or casualty beyond the reasonable control of Seller. If Seller's performance of the work is delayed, impacted, or prevented by a Force Majeure Event or its continued effects, Seller shall be excused from performance under the Agreement. Without limiting the generality of the foregoing, if Seller is delayed in achieving one or more of the scheduled milestones set forth in the Agreement due to a Force Majeure Event, Seller will be entitled to extend the relevant completion date by the amount of time that Seller was delayed as a result of the Force Majeure Event, plus such additional time as may be reasonably necessary to overcome the effect of the delay. To the extent that the Force Majeure Event directly or indirectly increases Seller's cost to perform the services, Buyer is obligated to reimburse Seller for such increased costs, including, without limitation, costs incurred by Seller for additional labor, inventory storage, expedited shipping fees, trailer and equipment rental fees, subcontractor fees or other costs and expenses incurred by Seller in connection with the Force Majeure Event.

(e) **BUYER RESPONSIBILITIES.** Buyer is solely responsible for the establishment, operation, maintenance, access, security and other aspects of its computer network ("Network") and shall supply Seller secure Network access for providing its services. Products networked, connected to the internet, or

otherwise connected to computers or other devices must be appropriately protected by Buyer and/or end user against unauthorized access. Buyer is responsible to take appropriate measures, including performing back-ups, to protect information, including without limit data, software, or files (collectively "Data") prior to receiving the service or products.